

Boiler Laws Committee

———— 1920-21 ————

REPORT



DELHI
SUPERINTENDENT GOVERNMENT PRINTING, I
1921

BOILER LAWS COMMITTEE.

No. 23-B. C.

Dated Delhi, the 10th March 1921.

FROM

F. D. ASCOLI, Esq., I.C.S.,
President, Boiler Laws Committee.

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
DEPARTMENT OF INDUSTRIES, DELHI.

SIR,

I have the honour to forward herewith for the information and orders of the Government of India the report of the Boiler Laws Committee. The Committee was constituted by Resolution No. A.-61, dated Simla, the 11th November 1920, as amended by Resolution No. A.-61, dated Delhi, the 19th November 1920. The Committee commenced its tour on the 25th November 1920 and returned to Delhi on the 20th February 1921; during its tour it visited all the provinces of British India, with the exception of Baluchistan and the North-West Frontier Province. The evidence of witnesses both official and non-official was obtained in writing and by oral examination except in Assam, where the proceedings took the form of a conference with representatives of the Assam Government and of the tea-planting community. In addition to the usual evidence a conference of mechanical engineers was held at Calcutta on the 7th January 1921. In continuation of the report we have added an Appendix containing a draft Act on the lines of which legislation might be undertaken, and draft regulations and rules framed under the draft Act in accordance with the views arrived at in the report.

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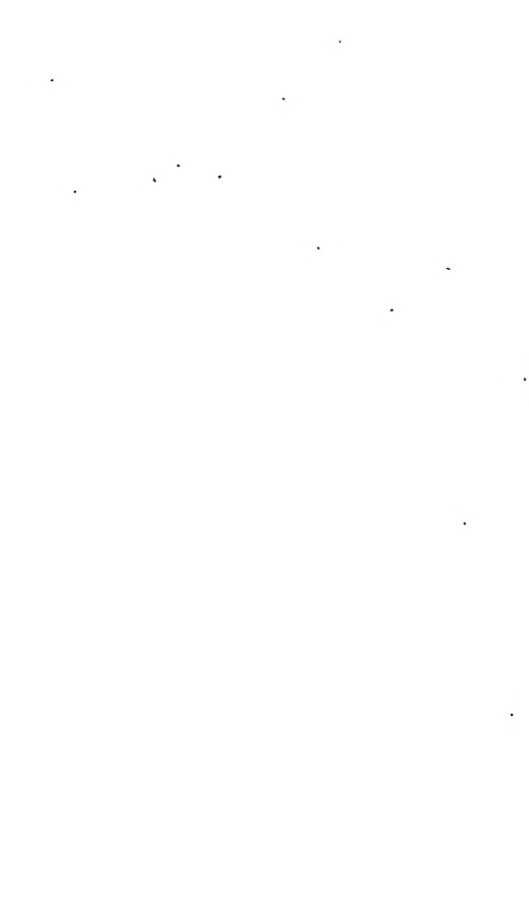
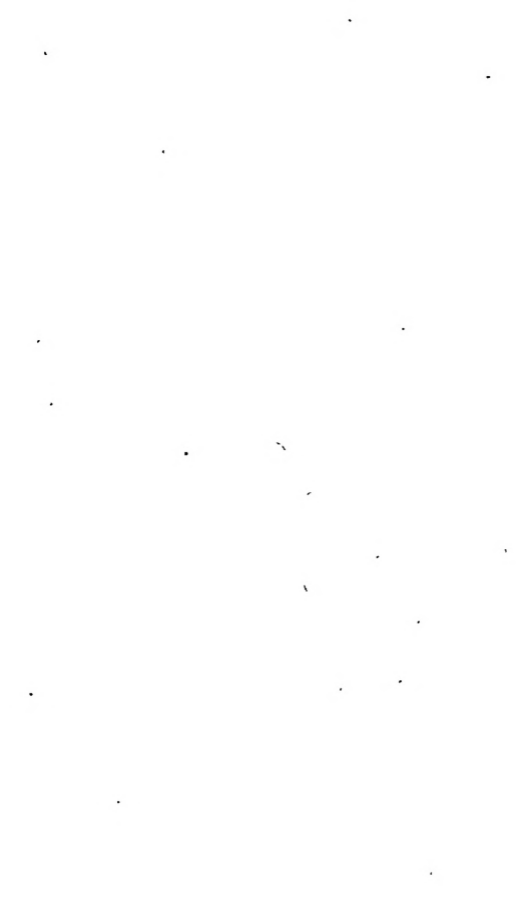


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REPORT.

I.—The Existing Law.

1. The necessity for boiler legislation is due to the fact that a boiler is an extremely dangerous machine, and that it is liable to explode, and to cause serious injury on account of factors in its construction and the effects of wear, tear and usage and as the result of the handling and management at the time of working. The object of the existing law has been to protect life and property from the danger of explosions. In India this object has been achieved mainly by the provision for the compulsory inspection of boilers by Government officers, and by the fact that explosions are now of very rare occurrence.

There are two distinct forms of inspection, and of a twofold nature, the distinction between which has been emphasised in the laws at present in force. The first form of inspection relates to the survey of a boiler when first erected, and is intended in a minor degree when structural alterations or renewals are made to a boiler; this survey is intended to test the design and construction of the boiler, to ensure that the boiler comes within a specified standard of safety, and to fix the initial pressure at which it may be worked with safety. The second form of inspection is concerned with subsequent periodic surveys of a boiler; the object of such surveys is to detect any deterioration in the boiler which may have occurred since the last survey.

The first type of survey is necessitated by such deterioration. The first type of survey consists theoretically in a complete measurement of the boiler and approval of the materials used in construction against certain specified theoretical standards, combined with a practical hydraulic test of strength. The second type of survey consists in a complete internal and external visual examination to detect signs of deterioration in the boiler, together with practical tests of parts where deterioration is detected against the same theoretical standard, and a similar practical hydraulic test of strength. Theoretically the same standard of test and working pressure should be invariable throughout the world; in practice the standard varies considerably in different parts of India, owing to the existence of different Acts, rules and regulations. These inspections and surveys constitute the backbone of boiler legislation in India for the protection of life and property. In a large area attempts have been made to secure a further degree of safety and to ensure the proper handling and management of boilers by insisting on the possession by the person in charge of a boiler of certain qualifications—qualifications of different degrees, which are determined by examination. The necessary qualifications and standard of examination differ materially in different parts of India. In other parts of India, however, it is maintained that for the safe working of a boiler, it is unnecessary to insist on such qualifications, and that the qualifications

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1. The necessity for boiler legislation is due to the fact that the steam boiler is an extremely dangerous instrument, that is liable to explode with disastrous consequences on account of faults in design and construction, the effects of wear, tear and usage and as the result of careless handling and management at the time of working. The object of boiler legislation has been to protect life and property from the dangers of such explosions. In India this object has been achieved mainly by insisting on the periodical inspection of boilers by Government agency, with the result that explosions are now of very rare occurrence. These inspections are of a twofold nature, the distinction between which has not been sufficiently emphasised in the laws at present in force. The first form of inspection relates to the survey of a boiler when first examined for use in India, and in a minor degree when structural alterations or renewals are made to a boiler; this survey is intended to test the design and construction of the boiler, to ensure that the boiler comes within a specified standard of safety, and to fix the initial pressure at which it may be worked with safety. The second form of inspection is concerned with subsequent periodic surveys of a boiler; the object of such survey is to detect any deterioration in a boiler due to wear and tear, damage in transit, foul feed water or defective management, and to determine whether any reduction of pressure is necessitated by such deterioration. The former type of survey consists theoretically in a complete measurement of the boiler and approval of the materials used in construction against certain prescribed theoretical standards, combined with a practical hydraulic test of strength. The second type of survey consists in a complete internal and external visual examination to detect signs of deterioration in the boiler, further practical tests of parts where deterioration is detected against the same theoretical standard, and a similar practical hydraulic test of strength. Theoretically the same standard of test and working pressure should be invariable throughout the world; in practice the standard varies considerably in different parts of India, owing to the existence of different Acts, which constitute the backbone of life and property. In a further degree of safety of boilers by insisting on the boiler of certain qualifications—qualifications of different degrees, which are determined by examination. The necessary qualifications and standard of examination differ materially in different parts of India. In other parts of India, however, it is maintained that for the safe working of a boiler, it is unnecessary to insist on such qualifications, and that the qualifications

necessary are a modicum of knowledge, years of experience and carefulness—a quality which no examination can test or ensure. Where the higher qualifications are insisted on, the object of the law tends to be misinterpreted as being mainly in the interests of the owner, i.e., for the maintenance of the condition of his boiler, and the main object and sole justification of the law—namely the protection of life and property—tend to be lost sight of. The remaining provisions of the law are subsidiary to the inspection and management of boilers and are largely administrative in character.

2. In the British Isles no law exists for the compulsory inspection of steam boilers on land by an official agency or for regulating the management and control of such boilers by certificated men. Attempts to introduce

**Legislation in the
British Isles.**

such legislation from time to time have met with the strongest opposition, and as recently as 1910 a "person-in-charge" bill was introduced and abandoned in the House of Commons. But it is a mistake to think that the position is analogous to the position in India. It is also a mistake to think that boilers in the United Kingdom are exempt from control. Provisions regarding steam boilers in Factories and Workshops are prescribed by section 11 of the Act of 1901, in Metalliferous Mines by Acts of 1872 and 1875 and in Coal Mines by section 56 of the Act of 1911; these Acts prescribe the safety devices to be fixed to every boiler; they require every boiler and its fittings to be maintained in a proper condition and lay down provisions for the periodical inspection of all such boilers by competent persons together with a record of such inspections. It is important to remember that in the United Kingdom it is the custom to insure boilers against the risk of accident or explosion, and that on this account steam boilers are subject to inspection and control by influential Boiler Insurance Companies and Associations. The inspections required by the various Acts are customarily made by Inspectors, the certificates being countersigned by the Chief Engineers, of these Companies and Associations; and it is largely in deference to the value of the work of these bodies that attempts to introduce an official inspecting agency have failed. Under the provisions of section 17 of the Factories and Workshops Act, 1901, powers are given by the legislature to prohibit summarily the use of a steam boiler in a dangerous condition, while the Boiler Explosion Acts of 1852 and 1890 provide for reports of explosions by the owner or user and for formal enquiries into the cause of the explosion. It should be noted that in these latter Acts, in which alone a steam boiler is defined, the definition is in very wide terms and includes steam pipes. It should also be noted that in the British Law the definitions of factories and workshops are so wide, that all boilers, with the exception of certain portable and vehicular boilers, that are liable to inspection in India, are also subject to the control of the law of the United Kingdom.

3. It has been suggested that it might be possible to adopt in India a system similar to that prevalent in the United Kingdom. We have carefully considered the suggestion but have arrived at the conclusion, that it is impracticable. The evidence that we

**Feasibility of inspecting
in India through Insur-
ance Associations.**

have heard shows unanimously the popularity of official inspection and the fact that it is done by a Government agency. It is not a private and commercial—far from it. It is a public and a private commercial concern, the ultimate aim of which must be the payment of a dividend to its shareholders. It is obvious that in India the same confidence would not be placed in an inspection at the hands of a private commercial company. It is doubtful if such a scheme could be initiated for other reasons. It is a known fact that it is not the ordinary practice in India to insure boilers, and it is stated that the leading Boiler Insurance Companies and Associations are not prepared to extend their operations generally to this country. It is a matter for grave doubt whether it would be possible to organize a similar Insurance Association for India, and it is beyond a question of doubt whether even a small proportion of the owners or users of boilers would avail themselves of the facilities afforded by such an Association; it is certain that the small owner would not. If insurance were made compulsory, we cannot see what advantage would exist over the present system—a certain disadvantage would be an increase in the cost of inspection and a consequent deterrent to industrial progress and the creation of a special staff to prevent the avoidance of insurance. The inspection of a boiler in an outlying area of a province is at present made at a loss, the excess ordinarily being covered by the profit derived from inspection fees in areas where boilers are numerous. If inspection were done by a private association, the profit of every transaction would be the first consideration, and the cost to the owner of a small installation in an outlying area would be abnormal. There is accordingly in India no alternative to inspection by a Government agency.

4. Legislation regarding the inspection of steam boilers other than marine boilers in India was first undertaken in the year 1864. As a result of a very serious explosion in Calcutta in December 1863 which occasioned the loss of 13 lives, a bill was introduced in the

Origin and development of boiler legislation: Bengal and Bombay.

Bengal Council to provide for the inspection of steam boilers and of machinery worked by steam in the town and suburbs

met with consider

provided only for

town and suburbs

Code) of 1862, which provided for the inspection of boilers on steamships.

and the

of a mixed commission of officials and non-officials under the presidency of the Commissioner of Police, Calcutta. In 1879 the Act was repealed and replaced by Act III (Bengal Code) of 1879. The main difference

in the new Act

outside the

made to the

The Bengal Acts have never required the employment of engineers. The origin of legislation on similar lines in Bombay the occurrence of two fatal accidents in the City of Bombay explosions of boilers. The original Act (VI, Bombay Code was based on Bengal Act VI of 1864; it applied to steam

prime-movers in the City of Bombay only and placed the work of inspection under the control of a mixed commission. Two serious explosions that occurred at Broach and Ahmedabad in 1871 proved the necessity for the extension of the Act beyond the limits of the City; it was pointed out that factories were "managed in a great measure by men who have but a slight acquaintance with the nature and management of steam machinery". The original bill provided merely for the extension of the Act outside the limits of Bombay City. In a note of the 11th April, 1873, recorded by His Excellency the Governor, it was pointed out that the main reason for legislation was the inefficiency of the men then employed in charge of steam machinery; it was accordingly decided to insist on the employment of certificated men in charge of steam engines. Despite very bitter opposition, this provision became law in Act V of 1873. In view of the existing controversy over the necessity of employing certificated men, it is interesting to note that their original introduction was due rather to the requirements of steam machinery generally than to boilers in particular. The initial examination rules were based on the Board of Trade Regulations for Marine Boilers and Engines as adapted for use in Bombay. In 1887 a new Act (III of 1887) was passed; strong opposition was again raised to the clauses regarding certificated engineers, on the ground that if any certificate were required, it should be given to the man in immediate charge of the boiler and not to the supervising engineer; the Act contained provisions for granting certificates on the basis of experience in addition to certificates granted after examination. In 1891 the Act was replaced by Act II of 1891 which subsequently gave way to the existing Act V of 1917. This Act differs in three very important matters from the existing Bengal Act; it dispenses with the existence of a mixed commission for the control of inspection work, and excludes the inspection of prime-movers, while on the other hand it retains the provisions requiring the employment of certificated engineers. Administratively the main difference lies in the fact that, whereas the Bombay Act is in force throughout the whole Presidency, in Bengal the Act applies only to certain notified areas. The Bengal and Bombay Acts constitute the basis of all boiler legislation in India.

5. In three provinces, viz., Assam, the North-West Frontier Province and Baluchistan no law for the inspection of steam boilers is at present in existence. In Bihar and Orissa the Bengal Act is in force and

Boiler legislation in other provinces.

the administration of the Act is in the hands of the Bengal Boiler Commission; in Delhi the Punjab Act is in force. Each of the other provinces has framed legislation on its own particular lines, the principles being based on the Acts of Bengal and Bombay. The history of this legislation may be briefly recorded.

- (a) *The Punjab*.—Proposals for legislation were originally made in 1891 as the result of a boiler explosion at Chunian. No Act was passed, however, until 1902 (Act II of 1902). The Act was based on the North-West (United) Provinces Act and paid scant regard to the existence of other legislation on the subject. Under the Act certificated engineers are required,

no boiler commission has been constituted and the Act applies only to notified areas.

(b) *The Central Provinces.*—In 1904 proposals were made for extending the Bombay Act of 1891 to the Central Provinces on the ground that the Act was already in force in Berar (amalgamated with the Central Provinces in 1903), that the number of boilers was rapidly increasing and that a practice had arisen of importing defective second-hand boilers in a dangerous condition from Bombay. A new Act was framed on the basis of the Bombay Act—except for numerous improvements in drafting and the relegation of much detail from the Act to rules; no material alterations were made. The Act (II of 1907) is in force over the whole of the Central Provinces and Berar.

(c) *Madras.*—In 1892 it was felt that owing to the increasing industrial importance of the Presidency it was necessary to legislate for the inspection of boilers and prime-movers on the lines adopted over the greater part of India. The new Act was based on the Burma Act with modifications based on the Bengal and Bombay Acts. Under the Act, which became law as Act III of 1893, no Boiler Commission was created; power was given—a power which has never been exercised—to insist on the employment of certificated engineers—while prime-movers could only be subjected to inspection by special notification—no such notification has been issued. Originally the Act applied only to the City of Madras, but in 1899 it was extended by notification to the whole of the Presidency; it is interesting to note that its provisions are in force in neighbouring native states such as Travancore. In 1904 and 1909 minor amendments were made to the Act. In 1904 a notification was issued requiring all engine-drivers in Municipal Waterworks to take out certificates under the Act; in 1905 this was made applicable to all engine-drivers in Government service.

(d) *Burma.*—In 1881 proposals were advanced for the framing of a Boiler and Prime-movers Inspection Act in order to bring the ports of Burma into line with those of Bengal and Bombay. The Bengal Act of 1879 was adopted with one important addition, *viz.*, the necessity of retaining certificated persons in charge of boilers. These proposals became law in Act XVIII of 1882, which was made applicable to the towns of Rangoon, Akyab, Bassein and Moulmein. In 1898 the Act was extended to 5 other towns, and in 1906 a Boiler Commission was established to control the work of the Boiler Inspectors, who had recently been made whole-time officials. In 1908 the Boiler Commission proposed that a new Act should be passed—the main defect in the Act of 1882 being that it contained no legal provisions for the constitution of the Commission. A new Act was accordingly framed, and

became law as Act II of 1910. It is interesting to note that in framing the Act the law in force in other provinces was not considered, until the Government of India called attention to the provisions of the new Central Provinces Act (II of 1907). The rules framed under the Act were, however, based on those in force in Bengal and Bombay. This Act has been extended subsequently to the whole of Burma excepting certain remote areas, where the difficulty of arranging for regular inspection and of obtaining certificated men in charge of boilers is great.

- (c) *United Provinces.*—The first Act in the United Provinces was passed in the year 1899 (Act I of 1899) as a result of a considerable number of boiler accidents and the increasing industrial importance of the province. Proposals for amending the Act were first made in 1911, and in 1913 it was decided to frame an entirely new Act with the object of bringing it into line with the Indian Factories Act and removing certain important defects regarding the use of boilers in an unsafe condition, accidents and control over repairs and alterations to boilers; the bill provided for the appointment of a Chief Inspector. The bill finally became law as Act III of 1915. The Act is one of special value, as it alone, of all Boiler Inspection Acts in India, was framed after consideration of other existing Acts. The Act applies to the whole of the province; it excludes prime-movers except by special notification, and requires the appointment of certificated engineers. It provides in detail for the employment of a Chief Inspector, and prescribes an improved system of appeal.

{ 6. It is an extraordinary fact that the seven different Acts show little indication that the various legislatures have attempted to take advantage to any considerable extent of the legislative labours of other provinces. Even where such has been the case as in the Central Provinces, no attempt has been made to consider the necessity of amendment, when the Act from which the Central Provinces measure originated (Bombay Act II of 1891) was repealed as obsolete, and replaced by a new Act in 1917. The existing Punjab Act of 1902 is based on an obsolete and repealed Act of 1899; Bengal has been content to retain an Act of 1879, subject to a few minor amendments, despite the fact that conditions have altered to a very large extent in the past 40 years, and despite the subsequent legislative labour of six other provinces. The Acts differ not only in form but in principle. The principle of insisting on the necessity of employing certificated engineers in charge of boilers was, as has been shown, initially adopted by Bombay, and has subsequently been accepted by all other provinces except Bengal and Madras; in Bengal the necessity of a certificate has never been admitted; in Madras the Act of 1893 allows for the issue of such certificates, but the power has never been exercised, except in the case of persons in charge of Government machinery. In Bombay, Madras, the United Provinces

and the Central Provinces and Berar, the Acts are in force over the whole of each province; in the other provinces they apply only to notified areas. In Bengal and Burma alone the administration of the Acts is in the hands of a commission composed of officials and non-officials, and the inspecting staff does not constitute a Government service. In Bombay alone prime-movers are absolutely excluded from the provisions of the Act; in Madras, the United Provinces and the Central Provinces the section relating to prime-movers has never been enforced, while in the rest of India the provisions of the law are, for all practical purposes, administratively ignored. Every Act contains inoperative and impossible provisions, which have survived from the days when Inspectors were not whole-time workers and provisions were required in the law for ensuring the prompt disposal of the work. Every province has adopted a different definition for a boiler, the differences being in some cases of vital importance. Exemption of boilers of different classes differs widely in principle. It is a relief to point to one single underlying principle, *viz.*, that boilers generally should be liable to inspection at certain periods and should not be permitted to work except under a certificate, stating the maximum pressure to be used. It is obvious that such differences as exist cannot be justified by the particular requirements of local conditions; on the other hand they point to an unjustifiable waste of legislative endeavour.

7. The provisions of each Act are supplemented by series of rules for administrative purposes; differences exist in these rules of far more serious importance than those in the Acts themselves. The rules may be classified generally under the following heads:—

Differences in existing rules.

- (a) Administrative Rules.
- (b) Technical Rules.
- (c) Inspection Rules.
- (d) Rules for the examination of certificated engineers

It is not necessary at this stage to enter into the differences in detail; the rules under headings (b) and (c) are of a purely technical nature and theoretically could not justifiably admit of variations to suit local conditions. In every case the rules are presumed to be based on the Board of Trade Regulations for Marine Boilers—the differences are due partly to a failure to appreciate the method of adaptation adopted in other provinces, partly to the adoption of Board of Trade Regulations of different dates. Constants and formulæ vary accordingly to a surprising extent, with the result that the pressure permissible for the same boiler may vary to an extraordinary degree in different provinces. In the Punjab no technical rules for the determination of pressure have been prescribed and the inspecting staff works, with no legal sanction, under the ægis of the Bombay rules. Four out of seven provinces lay down a formula for calculating the nominal horse power of a boiler—in every case the formulæ differ. Two standards exist for fixing the minimum size of safety valves—one being double the other. In only two provinces are the standards for hydraulic tests the same. To such an extent do the standards and systems of examination for certificated engineers and drivers differ, that it is rare for one province to accept a certificate granted in another. It is

obvious that such differences in rules, which are in their nature purely technical, must result in grave interference with industrial development, so far as the use of steam machinery is concerned.

II.—Discussion of the Main Problems.

8. The resolution by which the present Committee was constituted narrates succinctly the difficulties occasioned in India by the existence of seven different Acts and seven different sets of rules and regulations. In the terms of reference we have been instructed to report on two general problems and on one particular contentious matter. The general problems under consideration are the possibility of introducing a uniform India for steam boilers, and the possibility and regulations relating thereto; the desirability of insisting on the possession, by persons in charge of boilers, of certificates of competence or experience, issued by Government. We propose in our report to deal initially with the two general problems as briefly as possible—the problems are not in fact contentious—to state the result of our enquiries regarding the particular problem, after disposing of two special aspects of boiler legislation, which affect the question of insisting on certificates for persons in charge of boilers, and finally to submit our proposals for the unification of the Acts at present in force and of the rules and regulations framed thereunder, supported by a draft Act on the lines of which an All-India Act might be framed, a uniform set of technical regulations and a model set of administrative rules, which are based on the results of our enquiries.

9. The introduction of a uniform standard for steam boilers implies the framing of regulations for the material, design and construction of steam boilers, on the basis of which the maximum pressure at which a boiler can be worked is calculated. With the exception of the Punjab, all Provincial Governments, which have passed Acts on the subject, have framed regulations laying down such a standard. In all cases the regulations have been framed on the British Board of Trade Regulations for the design and construction of Marine Boilers—the only authoritative official publication on the subject. It might be thought that this would result in complete uniformity. This has not been the case for two main reasons:—

- (i) the regulations in different provinces in India have been based principally on Board of Trade Regulations of different dates; these differ very considerably and they are all now obsolete;
- (ii) the Board of Trade Regulations refer to marine boilers only, there being no official publication relating to land boilers. It is possible to standardise the general requirements of marine boilers to a far greater extent than those of land boilers, the types of which, *e.g.*, Cornish, Lancashire, externally fired, tubular, vertical, locomotive, etc., are numerous; in land boilers materials (*e.g.*, iron) may be used, which would

ordinarily be prohibited in marine boilers. Regulations for land boilers must take into account small types of boilers, e.g., those of fire engines, which are unknown at sea. It will be realised that without the control of any co-ordinating authority regulations for marine boilers afford scope for extraordinary differences, some of which may be theoretically justified, others that cannot even seek protection under this plea, during the process of adaptation to the requirements of land boilers. In some instances, where adaptation is essential, the marine regulations have been accepted unaltered; a conspicuous example of this labour-saving method is the insistence in several provinces on a 2" diameter for safety valves, a size which would be attended by ludicrous results in the case of small boilers of the fire-engine type. There is no justification for differences in the regulations in different provinces—the regulations are entirely technical in nature and cannot be affected by local conditions. It is obvious, however, that such differences must exist, unless the regulations are framed by a single authority. The actual result has been that a boiler, that has been passed for a certain pressure in one province under the regulations in force, may fail altogether to pass the test or may only pass the test for a lower maximum pressure in another province. Such instances have been specifically brought to our notice. We are not prepared to ascribe the reason entirely to essential differences in the regulations; in the inspection of boilers the personal element is a weighty factor, and the differences in the regulations in different provinces have resulted in what we would term "provincial jealousy," one province attempting to show that its inspection work and its regulations are superior to those of another province. However, pernicious this attitude may be, we are convinced that it is a fact—one that is not likely to be remedied, unless all provinces are subject to the same regulations and unless the work done in one province must be legally accepted as correct in other provinces. Practical examples of the evil effects of such diversities have been placed before us. The disadvantages of diverse regulations are not, however, confined to inspection work; manufacturers, importers and owners of boilers have complained bitterly and justifiably of the arbitrary differences existing in different provinces and the consequent obvious difficulties which they must encounter. The manufacturer in England and in other parts of the world can justifiably plead that it is impossible for him to construct up to any definite standard, where the regulations of any province may be altered from time to time without real technical justification, possibly to meet the whim of a Chief Inspector. A specific example was brought to our notice of the proposed rejection by the Madras Government on the basis of a defective rule of a standard boiler manufactured by a leading firm of boiler manufacturers, Messrs. Babcock

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON, D. C.
OFFICE OF THE CHIEF, BUREAU OF PLANT INDUSTRY
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REPORT OF THE CHIEF, BUREAU OF PLANT INDUSTRY
FOR THE YEAR 1914

UNITED STATES DEPARTMENT OF AGRICULTURE
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11. It follows, if the necessity for uniform conditions for the design and construction of boilers be admitted, that
Unification of the Acts only be framed under a

of The power to frame such an Act now rests with the Government of India by statute. In paragraph 6 of this report we have indicated briefly the differences existing in the Acts now in force; it is unnecessary to recapitulate them in detail. There are few differences that are fundamental, none that are incapable of assimilation; the sketchy Bengal Act of 1879 implies much that is over-elaborated in the latest legislation—the wordy Bombay Act of 1917. There is no Act that does not contain a considerable amount of unworkable and obsolete matter—a survival of days when boiler inspection was in its infancy. We have accordingly prepared a draft Act on which subsequent legislation may be based, assimilating differences in and eliminating unnecessary matter from existing legislation. The main principles of this Act are the appointment of inspectors as Government servants under the control of a Chief Inspector, the enactment of a system of registration of boilers that will be valid over the whole of India—a necessary measure for the maintenance of a uniform standard—of the manner and methods of annual inspection, of a system of enquiry into accidents and of hearing of appeals, and of a series of penalties for infringement of the provisions of the Act. The detailed provisions of this draft Act are dealt with in detail in a subsequent part of this report. In order to avoid unwieldiness of the Act and difficulties in its administration, we have relegated a considerable mass of administrative and technical details to regulations and rules framed under the Act. We have drawn a sharp distinction between regulations and rules. The former deal solely with technical matters, in which uniformity is essential and provisions for local conditions unnecessary, and with the registration of boilers, by which, it is hoped, uniformity in working will be attained. The draft regulations consist of two parts—

- (i) Standard Conditions for the material, design and construction of boilers.
- (ii) Regulations for the registration and inspection of boilers.

In accordance with the evidence that we have heard, we propose that these regulations should be framed and issued by the Government of India, which alone will have authority to alter them. We further propose that Local Governments should have power to issue rules connected with the administration of the Act, and we have, for their guidance, framed model rules, based on the draft Act, in 7 parts:—

- (i) Preliminary,
- (ii) Duties of the Chief Inspector,
- (iii) Duties of Inspectors,
- (iv) Administrative instructions for the registration of boilers,
- (v) Administrative instructions for the inspection of boilers.
- (vi) Rules regarding accidents, and
- (vii) Rules for appeals.

and Wilcox, for a defect which in the rest of the world is considered sound boiler practice. With a single set of regulations in force for the whole of India, manufacturers cannot complain of ignorance of the standard required.

10. The difficulties resulting from the existing system were brought to the notice of the Government of India by the Government of Madras in the year 1912. It is unnecessary now to enter into the details of the correspondence; for various reasons a decision was postponed pending the appointment of the present Committee to report on the general question of boiler legislation in India. The evidence on the necessity of framing a uniform standard for the whole of India has been unanimous, and in order that uniformity may be arrived at and maintained, the principle has been accepted, that the standard should be laid down by the Government of India, and that no modifications of that standard should be made except by the Government of India. In accordance with this decision and in virtue of the fact that under the scheme of constitutional reform of the Government of India, we have a uniform standard for the material, and on the latest regulations issued in 1920, the attention

(a) Director-General of Stores, India Office, to the Secretary to the Government of India, Department of Commerce and Industry, No. S-17636, dated the 28th October 1920.

of the Government of India was called to these regulations by the Director-General of Stores, India Office, (a) "in the event of any revision and co-ordination of the Indian Boiler Regulations being contemplated"; it was pointed out that there were the strongest reasons, why the boiler requirements of India from the technical side should be alike; the

majority of boilers in use in India were made in England, and manufacturers were not often aware that existing requirements differed. The latest Board of Trade Regulations, *viz.*, "Standard Conditions for the design and construction of Marine Boilers, 1920" are based on the report of the British Marine Engineering Design and Construction Committee, convened in the year 1918, as modified by a conference held with the Board of Trade in 1920. This Committee consisted of representatives of the principal marine authorities, *viz.*, the Institution of Naval Architects, the Institution of Engineers and Shipbuilders in Scotland, the North-East Coast Institution of Engineers and Shipbuilders, the Institute of Marine Engineers, the Liverpool Engineering Society, Lloyd's Register of British and Foreign Shipping, the British Corporation for Survey and Registry of Shipping and the Bureau Veritas International Register of Shipping. The proceedings of this influential committee are authoritative, and the revised publication of the Board of Trade has been accepted by the three principal Registers of Shipping. We have accordingly had no hesitation in basing our regulations for standard conditions for the design and construction of steam boilers in India on the latest Board of Trade Regulations. The methods employed in adapting these regulations to the design and construction of land boilers are described in a later stage of this report.

11. It follows, if the necessity for uniform conditions for the design and construction of boilers be admitted, that such regulations can only be framed under a single uniform Act—framed by the Government of India and applicable to all provinces alike. The power to frame such an Act now rests with the Government of India by statute. In paragraph 6 of this report we have indicated briefly the differences existing in the Acts now in force; it is unnecessary to recapitulate them in detail. There are few differences that are fundamental, none that are incapable of assimilation; the sketchy Bengal Act of 1879 implies much that is over-elaborated in the latest legislation—the worthy Bombay Act of 1917. There is no Act that does not contain a considerable amount of unworkable and obsolete matter—a survival of days when boiler inspection was in its infancy. We have accordingly prepared a draft Act on which subsequent legislation may be based, assimilating differences in and eliminating unnecessary matter from existing legislation. The main principles of this Act are the appointment of inspectors as Government servants under the control of a Chief Inspector, the enactment of a system of registration of boilers that will be valid over the whole of India—a necessary measure for the maintenance of a uniform standard—of the manner and methods of annual inspection, of a system of enquiry into accidents and of hearing of appeals, and of a series of penalties for infringement of the provisions of the Act. The detailed provisions of this draft Act are dealt with in detail in a subsequent part of this report. In order to avoid unwieldiness of the Act and difficulties in its administration, we have relegated a considerable mass of administrative and technical details to regulations and rules framed under the Act. We have drawn a sharp distinction between regulations and rules. The former deal solely with technical matters, in which uniformity is essential and provisions for local conditions unnecessary, and with the registration of boilers, by which, it is hoped, uniformity in working will be attained. The draft regulations consist of two parts:—

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The rules and regulations are described in greater detail towards the end of this report.

12 The particular problem submitted to us for consideration relates to the advice.

Problems connected with
certificated persons in
charge.

persons in
It is essential

problems which are of considerable importance in dealing with the necessity of retaining certificated engineers or boiler attendants. These problems are —

(a) Should the Act apply to provinces as a whole, or only to notified areas?

(b) Should the Act be applicable to prime-movers?

The application of the first problem may not be apparent, unless the obvious invidiousness and injustice of the position is realised, where an owner on one side of a street may be compelled to retain a certificated attendant at considerable expense owing to the fact that his boiler is situated in a notified area, while his brother owner on the unnotified side of the street is under no such compulsion. The application of the second problem is more apparent and raises the question, whether it is the prime-mover or the boiler, which is really responsible for the existence of the system of certificated men.

13 Of the Acts at present in force, those of Bombay, the United Provinces and the Central Provinces alone apply

Extent of application of
Act within provinces.

of their own force to the whole of the Province; in Madras the Act has been extended by notification to the whole of the Presidency, while the Bengal, Burma and Punjab Acts have been extended to certain notified areas only. The position is anomalous. Commencing with the axiom that boiler inspection is intended for the protection of life and property and that, if it fails in that, there is no justification for making it compulsory, we must admit that a boiler is an equally dangerous implement and equally liable to explode, wherever it may be situated.

I even advance beyond this admission, and state categorically that the more remote the position of the boiler, the more distant it is from the notified area, the less likely is it to receive the expert attention, inspection and cleaning and in the provision of fuel. We find that in provinces where the Act has only been applied to notified areas, such areas are industrial centres. We are led to the conclusion that the most dangerous boilers in such areas are those exempted from inspection. Such exemption could only be justified if inspection is impracticable. It is possible that in more remote parts of Burma, where the fact that boilers are scattered over the whole of the province is a fact that hinders the means of inspection, the Act is not applicable to any other part of the province. In the south of Madras boilers are widely scattered.

gardens and coffee and rubber plantations, are regularly inspected. We see no reason why other parts of India should be exempt. It does not appear that the omission of any area, except in Burma, has been purposive. The original Acts, it is true, only applied to the principal cities; but an Act in origin differs widely from an Act, when once its meaning and importance are understood. Initially it appears that there was considerable trepidation in extending the operation of the various Boiler Acts owing to an apprehension, perhaps a mis-apprehension, that its operation might prove detrimental to industrial progress in newly-developing areas; this is clearly illustrated in the history of the application and extension of the present Punjab Act. There is little doubt that this apprehension was unfounded except in so far as the retention of certificated persons in charge of boilers was compulsory. In Bengal, including Bihar and Orissa, this aspect of the problem has never been prominent, and the question of the general extension of the Act, which the Government of Bengal now accepts as necessary, has never been fully considered. In Burma local conditions may be such as to render the further extension of the Act impracticable. The evidence that we have heard proves the popularity, importance and necessity of boiler inspection and supports our conclusion that the new Act should be in force over the whole of India. We consider this conclusion to be of such

that we do not propose to
 Governments power to exempt
 Act, however, we propose that
 powers to exclude local areas should be exercised by the Government of India—in order to deal with any exceptional cases that may arise. We would call attention to the fact that in these conditions the first objection to the compulsory employment of certificated persons-in-charge of boilers vanishes.

Exclusion of special areas:-

- (i) Baluchistan,
- (ii) The tea area of North-east India.
- (iii) The indigo area of Bihar.

14. Before considering the application of the Act to prime-movers it will be convenient to discuss suggestions made for the exclusion of certain specific areas:

- (i) The case of Baluchistan can be briefly dealt with. It is reported that there are only two boilers in existence in the province, but this appears to exclude boilers the property of Government. It is probably inadvisable that Baluchistan should be excluded absolutely from the Act, and we are of opinion that it would not be correct in principle to exclude it under section 4 of the draft Act. It is however obviously impracticable to organise a special staff for the province, and
- circumstances of the
 locomotive superin-
 ith powers as an in-
 spector, subordinate to the Chief Inspector of Boilers,
 Bombay.
- (ii) The case of the tea area of North-East India has been very strongly argued before us by the Chairman of the Indian

The rules and regulations are described in greater detail towards the end of this report.

12. The particular problem submitted to us for consideration relates to the advisability of retaining the law requiring persons in charge of boilers to possess certificates. It is essential, however, to consider first two problems which are of considerable importance in dealing with the necessity of retaining certificated engineers or boiler attendants. These problems are:—

(a) Should the Act apply to provinces as a whole, or only to notified areas?

(b) Should the Act be applicable to prime-movers?

The application of the first problem may not be apparent, unless the obvious invidiousness and injustice of the position is realised, where an owner on one side of a street may be compelled to retain a certificated attendant at considerable expense owing to the fact that his boiler is situated in a notified area, while his brother owner on the unnotified side of the street is under no such compulsion. The application of the second problem is more apparent and raises the question, whether it is the prime-mover or the boiler, which is really responsible for the existence of the system of certificated men.

13. Of the Acts at present in force, those of Bombay, the United Provinces and the Central Provinces alone apply of their own force to the whole of the Province; in Madras the Act has been extended by notification to the whole of the Presidency, while the Bengal, Burma and Punjab Acts have been extended to certain notified areas only. The position is anomalous. Commencing with the axiom that boiler inspection is intended for the protection of life and property and that, if it fails in that, there is no justification for making it compulsory, we must admit that a boiler is an equally dangerous implement and equally liable to explode, wherever it may be situated. We would even advance beyond this admission, and state categorically that the more remote the position of the boiler, the more distant it is from an industrial area, the less likely is it to receive the expert attention required in working, upkeep and cleaning and in the provision of clean feed-water. We find that in provinces where the Act has only been extended to notified areas, such areas are industrial centres. We are accordingly left with the conclusion that the most dangerous boilers in such provinces are exempt from inspection. Such exemption could only be justified on the ground that inspection is impracticable or only possible at an abnormal expenditure. It is possible that such conditions might apply to some of the more remote parts of Burma—despite the fact that Bombay is able to arrange for inspections so far distant as Aden; we do not think that they are applicable to any other part of India. In Bombay a large number of the boilers under inspection are situated in scattered cotton ginning factories; in the Central Provinces and Berar boilers are scattered widely over the whole of the province with indifferent means of communication. In the south of Madras boilers, situated in the widely scattered tea

gardens and coffee and rubber plantations, are regularly inspected. We see no reason why other parts of India should be exempt. It does not appear that the omission of any area, except in Burma, has been purposive. The original Acts, it is true, only applied to the principal cities; but an Act in origin differs widely from an Act, when once its meaning and importance are understood. Initially it appears that there was considerable trepidation in extending the operation of the various Boiler Acts owing to an apprehension, perhaps a mis-apprehension, that its operation might prove detrimental to industrial progress in newly-developing areas; this is clearly illustrated in the history of the application and extension of the present Punjab Act. There is little doubt that this apprehension was unfounded except in so far as the retention of certificated persons in charge of boilers was compulsory. In Bengal, including Bihar and Orissa, this aspect of the problem has never been prominent, and the question of the general extension of the Act, which the Government of Bengal now accepts as necessary, has never been fully considered. In Burma local conditions may be such as to render the further extension of the Act impracticable. The evidence that we have heard proves the popularity, importance and necessity of boiler inspection and supports our conclusion that the new Act should be in force over the whole of India. We consider this conclusion to be of such

that we do not propose to Governments power to exempt Act, however, we propose that powers to exclude local areas should be exercised by the Government of India—in order to deal with any exceptional cases that may arise. We would call attention to the fact that in these conditions the first objection to the compulsory employment of certificated persons-in-charge of boilers vanishes.

Exclusion of special areas:-

- (i) Baluchistan,
- (ii) The tea area of North-east India,
- (iii) The indigo area of Bihar.

14. Before considering the application of the Act to prime-movers it will be convenient to discuss suggestions made for the exclusion of certain specific areas :

- (i) The case of Baluchistan can be briefly dealt with. It is reported that there are only two boilers in existence in the province, but this appears to exclude boilers the property of Government. It is probably inadvisable that Baluchistan should be excluded absolutely from the Act, and we are of opinion that it would not be correct in principle to exclude it under section 4 of the draft Act. It is however obviously impracticable to organise a special staff for the province, and we would suggest that in the very special circumstances of the province some competent official, e.g., a locomotive superintendent, should be vested specially with powers as an inspector, subordinate to the Chief Inspector of Boilers, Bombay.

- (ii) The case of the tea area of North-East India has been very strongly argued before us by the Chairman of the Indian

Tea Association and at a conference held at Shillong, at which the Government of Assam and representatives of the planting community were present. Tea gardens are practically confined to the Darjeeling and Jalpaiguri districts of Bengal, areas not notified under the existing Act, and to the province of Assam, where no Act is at present in force. Four arguments were advanced against the application of the new Act to these areas:—

- (a) that accidents are of very rare occurrence;
- (b) that inspection by Government will be impracticable owing to difficulties of communication;
- (c) that boilers are in charge of efficient engineers, and
- (d) that special arrangements for inspection exist.

The first argument we are not prepared to accept, and a detailed examination of the boilers would be necessary before it would be possible to arrive at any definite conclusion on this contention. The second

argument is not correct. In the planting area of Madras, where distances are and successful; in the greater part of the area of the Central Provinces and

Berar means of communication are incomparably worse. The real force of the argument lies in the fact that to prevent dislocation of the industry, inspections must be made between the months of December and March; as is shown below this will present no difficulty. The third argument is one that could be advanced with far greater claim to acceptance by the jute and engineering industries with which Government inspection is popular; the qualifications of the engineers employed on the average tea garden fail utterly to support any claim to special treatment. The last argument, *viz.*, that special arrangements exist for inspection, is one that is shared by many industries and is true only to a

limited extent. In certain groups of European in others they are not; while inspection is not complete, seems certain that no definite

rules are in force for regulating the pressure allowable. It is clear that no special case can be established for the exclusion of the tea industry. There are further reasons for insisting on the extension of the Act to Assam. A considerable number of boilers are employed in other industries—saw-mills, rice-mills, and oil-mills—over these inspection is essential. It was further stated to us by the Inspector of Government Boilers, that owing to the absence of an Act in Assam, it has now become the practice to import into that province boilers, which have been condemned for use by the rules in force in other provinces—the cause that originated a Boiler Act in the Central Provinces. The advantages that would result from the new Act were admitted in full by the representative of Indian-owned gardens, and in part, especially as regards the facilities for the purchase and sale of boilers, by all present at the Shillong Conference. We are unable to recommend that the tea industry should be subject to any special treatment. It is clear, however, that Assam will not be able to provide by itself the

organisation which we propose under the new Act. It will be necessary to complete practically the whole of the inspection within four months; for eight months accordingly the inspecting staff would be idle, unless employed on other work for which it would probably be ill fitted. In any circumstances Assam would be unable to afford the expense of a Chief Inspector. It would accordingly be necessary for Assam to work in conjunction with the supervising and inspecting staff of Bengal—arrangements being made to complete the work in Assam between the months of December and March—such an arrangement would present no difficulty, and we are satisfied that no abnormal cost would be involved. The difficulties of employing certificated engineers in such areas are discussed in paragraph 22.

(iii) *The indigo area of Bihar.*—The arguments put forward against the inspection of indigo-factory boilers in Bihar were similar to those advanced in Assam. These boilers are inspected by an engineering firm—Messrs. Arthur Butler and Company—but it is admitted that the test applied is merely one of the conditions of the boiler—there is no test against any definite standard. It is moreover obvious, that it would be impossible to ensure that inspections made by a private firm should follow the lines, or be based on the standard laid down in Government rules; it is further obvious that an exemption under these conditions from the provisions of the Act would result in wider and more obvious claims to exemption. We are satisfied that inspection by Government agency in this area would not be attended by any difficulties.

15. The Law regarding the inspection of prime-movers varies considerably in different provinces. The Bombay Act of 1917 excluded prime-movers absolutely from the operation of the Act; in the Acts in

Inspection of prime-movers. force in Madras, the United Provinces and the Central Provinces and Berar prime-movers may be included by notification; in Bengal, Burma and the Punjab alone do the provisions of the Acts extend of their own force to prime-movers. In the former three provinces no notifications have been issued; in the latter group the law, so far as it applies to prime-movers, is a dead letter, except in Burma, where a formal but incomplete examination is made. In considering the necessity of inspecting prime-movers, it is important to realise the circumstances under which prime-movers first intruded in the Acts. It has been shown in paragraph 4 that the original Act, Bengal Act VI of 1864, was based on Bengal Act V of 1862, an Act which provided for the inspection of boilers and machinery on steamships. In a steamship the boilers and the engines are more intimately connected, and an accident or break-down at sea is obviously fraught with greater danger than in the case of steam machinery on land. This distinction was not clearly recognised, and accordingly the inspection of prime-movers became an integral part of the law. The mistake was not recognised until the year 1886, when Bombay Act III of 1887 was under discussion in Council. The reasons then advanced were admirably summarised

in a speech in the Bombay Legislative Council made by the Honourable Mr. Javerilal Umiashankar Yajnik on the 4th March, 1891, in the debate on Bombay Act-II of 1891. "When the Act now in force (Act III of 1887) was considered by the legislature in 1886, this point about the application of the Act to prime-movers was carefully weighed. On the one hand it was held that there is much ignorance in this country on the subject of machinery and how to work it. On the other hand, it was maintained that such accidents are rare, that they do not often result in loss of life, that examinations of engines are not generally effective in preventing them, and that there are serious objections to an examination, which requires large engines to be pulled to pieces and put together again, perhaps in a very hurried manner, in order to avert loss from stoppage of a factory". We have little to add to these remarks; the thickness of metal in a cylinder is such as to render an explosion highly improbable, while the absence of heated water under pressure considerably lessens the dangers resultant from such an explosion. If inspection is to be effective, it must necessitate the stoppage of work in large mills and factories for several days—while spare boilers are essential in large installations, it is not reasonable to expect that spare prime-movers should be kept. It is clear that the number of accidents can only be accentuated by and that for the obviation of would be of little value. We have been unable to trace any considerable number of accidents which could have been prevented by insistence on inspection. If inspection of prime-movers were to be enforced, the increase required in the strength of the inspection staff and consequent expenditure would be out of all proportion to any possible advantages that might accrue. In these conclusions we are supported almost unanimously by the evidence that we have heard, and we have accordingly no hesitation in recommending that the present practice of neglecting the inspection of prime-movers be confirmed by the exclusion of prime-movers from the new Act. We are satisfied that the powers at present possessed by Factory Inspectors for fencing off and preventing the use of dangerous machinery are sufficient for the purposes of the law, *viz.*, the protection of life and property.

16. The law which required the periodic inspection of prime-movers included not only the inspection of the boiler and the prime-mover, but also that of the steam-pipe connecting them; even in areas where prime-movers are not now included in the Act (*e.g.*, Bombay), rules still exist—without any legal justification it is true—for the inspection of steam-pipes. If the proposals made in the preceding paragraph are accepted, it is still necessary to decide, whether any control over the construction and inspection of steam-pipes should be retained under the Act. It must be remembered that the main steam-pipe, namely, the range from the stop-valve of the boiler or boilers to the stop-valve of the prime-mover or its equivalent, carries steam in a comparatively thin casing at a pressure equal to that contained in the boiler. From figures that have been placed before us, it appears that the only fatal explosions, that

have occurred in recent years have been experiments of such a nature, and it is obvious that their dangers are incomparably greater than those from the chimneys of prime-movers. We have something taken as evidence, a considerable amount of evidence on this subject, and the weight of evidence confirmed by a conference with mechanical engineers held in London (see Appendix IV) has been in favour of including the main steam-pipe within the scope of the Act. That such it will be important to apply the Act to the vast system of piping in a large modern mill or factory, and we propose that the provisions of the new Act shall apply only to the main steam-pipe as described above. It is now necessary to lay down rules for the material, installation and inspection of steam-pipes. In the technical regulations we have proposed that steam-pipes should be constructed of wrought iron, mild or cast steel only; the exclusion of cast iron is a decision supported by practically all the technical evidence that we have heard is due to the fact that though sufficiently strong in itself, the material is unstable under the shocks and stresses resulting from water-hammer and vibration; the strength of the pipes is often externally weakened owing to the chipping of the core at the time of casting, with the consequence that the thickness of metal varies considerably at different parts of the periphery of the pipe. It is not proposed that this new regulation should affect existing installations, unless they are condemned on inspection. In order to avoid defects where new pipes are laid down, and to ensure efficient drainage, we have framed

the following regulations:—
 1. The main steam-pipe shall be covered by the Chief Inspector.
 2. The main steam-pipe shall not be exposed to the atmosphere.
 3. The main steam-pipe shall be of the pipe is an efficient preventive to internal inspection; the comparative absence of water to any extent, however, in the piping renders the danger of internal corrosion remote. We have entered in the draft Act provisions for the inspection of the main steam-pipe, based on the following provisions, based on the following provisions:
 4. The main steam-pipes by the Chief Inspector.
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17. It has been shown that the extension of the Act to the whole of every province removes one objection to the compulsory retention of certificated persons in charge of boilers; it will now be shown on the other hand that the exclusion of prime-movers from the Act removes the whole foundation on which their retention is based. A perusal of paragraph 4 will recall the

The origin of the law requiring persons in charge of boilers to possess certificates.

in a speech in the Bombay Legislative Council made by the Honourable Mr. Javerilal Umiashankar Yajnik on the 4th March, 1891, in the debate on Bombay Act II of 1891. "When the Act now in force (Act III of 1887) was considered by the legislature in 1886, this point about the application of the Act to prime-movers was carefully weighed. On the one hand it was held that there is much ignorance in this country on the subject of machinery and how to work it. On the other hand, it was maintained that such accidents are rare, that they do not often result in loss of life, that examinations of engines are not generally effective in preventing them, and that there are serious objections to an examination, which requires large engines to be pulled to pieces and put together again, perhaps in a very hurried manner, in order to avert loss from stoppage of a factory". We have little to add to these remarks; the thickness of metal in a cylinder is such as to render an explosion highly improbable, while the absence of heated water under pressure considerably lessens the dangers resultant from such an explosion. If inspection is to be effective, it must necessitate the stoppage of work in large mills and factories for several days—while spare boilers are essential in large installations, it is not reasonable to expect that spare prime-movers should be kept. It is its can only be accentuated and that for the obviation would be of little value. We

have been unable to trace any considerable number of accidents which could have been prevented by insistence on inspection. If inspection of prime-movers were to be enforced, the increase required in the strength of the inspection staff and consequent expenditure would be out of all proportion to any possible advantages that might accrue. In these conclusions we are supported almost unanimously by the evidence that we have heard, and we have accordingly no hesitation in recommending that the present practice of neglecting the inspection of prime-movers be confirmed by the exclusion of prime-movers from the new Act. We are satisfied that the powers at present possessed by Factory Inspectors for fencing off and preventing the use of dangerous machinery are sufficient for the purposes of the law, viz., the protection of life and property.

16. The law which required the periodic inspection of prime-movers

Steam-pipes.

included not only the inspection of the boiler and the prime-mover, but also that of the steam-pipe connecting them; even in areas where prime-movers are not now included in the Act (*e.g.*, Bombay), rules still exist—without any legal justification it is true—for the inspection of steam-pipes. If the proposals made in the preceding paragraph are accepted, it is still necessary to decide, whether any control over the construction and inspection of steam-pipes should be retained under the Act. It must be remembered that the main steam-pipe, namely, the range from the stop-valve of the boiler or boilers to the stop-valve of the prime-mover or its equivalent, carries steam in a comparatively thin casing at a pressure equal to that contained in the boiler. From figures that have been placed before us, it appears that the only fatal explosions, that

have occurred in recent years, have been explosions of such pipes, and it is obvious that their dangers are incomparably greater than those from the cylinders of prime-movers. We have accordingly taken a considerable amount of evidence on this subject, and the weight of evidence, confirmed by a conference with mechanical engineers held in Calcutta (*vide* Appendix IV), has been in favour of including the main steam-pipe within the scope of the Act. Obviously it would be impracticable to apply the Act to the vast system of piping in a large modern mill or factory and we propose that the provisions of the new Act should apply only to the main steam-pipe as described above. It is accordingly necessary to lay down rules for the material, installation and inspection of steam-pipes. In the technical regulations we have suggested that steam-pipes should be constructed of wrought iron, mild or cast steel only; the exclusion of cast iron—a decision supported by practically all the technical evidence that we have heard—is due to the fact that though sufficiently strong in itself, the material is unable to stand the shocks and stresses resulting from water-hammer and vibration; the strength of the pipes is often materially weakened owing to the shifting of the core at the time of casting, with the consequence that the thickness of metal varies considerably at different parts of the periphery of the pipe. It is not proposed that this new regulation should affect existing installations, unless they are condemned on inspection. In order to avoid defects where new pipes are laid down, and to ensure

that the steam-pipe need not be so complete as that of a boiler—in fact the diameter of the pipe is an effectual preventive to internal inspection; the comparative absence of water to any extent, however, in the piping renders the danger of internal corrosion remote. We have entered in the draft Act provisions for the inspection of steam-pipes, and have framed regulations, based on the technical evidence recorded, for the testing of steam-pipes by hydraulic pressure at the time of installation and at periods of five years; the test will be made *in situ* after blank-flanging the ends of the pipes and the removal of such lagging as the Inspector may require; such a procedure will result in the least possible interference with the owner, compatible with the safety of employees. Inspectors will be given powers, subject to the approval of the Chief Inspector, to condemn the piping and to order replacement, and will be authorised to refuse to renew the boiler certificate, until such orders have been carried out. We do not, however, propose to require a special certificate for the steam-pipe as in the case of a boiler; it will suffice if the results of inspections are systematically recorded in the boiler certificate.

17. It has been shown that the extension of the Act to the whole of every province removes one objection to the compulsory retention of certificated persons in charge of boilers; it will now be shown on the other hand that the exclusion of prime-movers from the Act removes the whole foundation on which their compulsory retention is based. A perusal of paragraph 4 will recall the fact that

The origin of the law requiring persons in charge of boilers to possess certificates.

this provision of law was first introduced in Bombay Act V of 1873, that it was introduced owing to the fact that steam machinery generally, and that its strong opposition.

This provision of law Act III of 1887 was passed, and the opposition centred on the problem of the person who should be compelled to have the certificate—the supervising engineer or the actual boiler attendant. The provisions of the law and the regulations for examinations were based on the Board of Trade Regulations for Marine Boilers and Engines. The existing practice in the five provinces, where certificates are required by law, is based entirely on the precedent of marine requirements. This basis rests, however, on a false analogy. It is obvious that the conditions under which machinery is used at sea and on land are essentially different. While collapsed furnaces in a land boiler may necessitate the closing down of a factory and occasion considerable pecuniary loss to the owner, a similar accident at sea would place a large number of persons in a helpless position of danger. Terrible as may be the effects of an explosion of a boiler on land, they cannot be compared with the catastrophe that such an explosion would cause at sea. The differences in steam machinery are equally marked. In a mill or factory it is possible in case of an accident to close down the machinery without inconvenience to the public, and to arrange for necessary repairs; in mid-ocean the stoppage of machinery and the impossibility of effecting repairs except through the agency of the ship's engineers may bring hundreds of lives into a position of grave peril. The dangers at sea and on land are obviously on different planes, and the necessity of employing at sea persons of proved knowledge and capacity, beyond what is required merely for running boilers and steam engines, is obvious. When the system was adopted for land boilers and machinery in India, this distinction was not recognised. Fifty years ago, it is true, the fact that knowledge of the working of steam machinery in India was very limited might have justified the enforcement of special conditions, had the distinction been recognised; this plea cannot however be advanced at the present time. It must be recognised that the justification of and necessity for employing certificated engineers at sea are not so much the dangers resulting directly from an accident to a boiler or the engines, as the impossibility of closing down the engines and executing repairs except at great peril at sea. In this respect the care of the engine, a more complicated mechanism than a boiler, is of vital importance. It has already been shown that, except in Burma, the inspection of engines has been relegated to a very shadowy position under existing Acts—an implicit recognition of the falsity of the analogy between conditions at sea and on land.

18. It is now clear that the necessity of retaining certificated persons in charge of boilers on land must depend on the intrinsic merits of the case. In paragraph 15 we have stated in detail our reasons for excluding prime-movers from the operation of the new Act. It follows that it is impossible to frame provisions in the Act for the examination of and the grant of certificates to persons for anything except a knowledge of boilers—which alone are included in the Act. The examination

Result of excluding
prime-movers from the
Act.

could accordingly refer only to the competence of a person to take charge of a boiler—it cannot, unless the Act is to be extended as an Act for the promotion of knowledge of mechanical engineering, cover a knowledge of prime-movers or steam machinery. In all provinces where certificates are required by law, the examination requires a considerable knowledge of steam machinery, and only in the case of the lowest class of engine-driver—a man permitted to hold charge of the very smallest plant, is the examination confined to a knowledge of the boiler only. If the examination were to be confined to such knowledge and the holding of a certificate were necessary for persons in charge of any boiler, it follows that the lowest class of driver must necessarily be promoted to the charge of the largest boilers. Such a position obviously implies the existence of a fallacy and appears to reduce the existing position *ad absurdum*. Of the witnesses whom we have examined it would not be an exaggeration to say that 75 per cent. initially favoured the retention of certificates, but that when the scope of the proposed new Act was explained to them, it was almost universally admitted, that insistence on certificates would be useless and impracticable. It is true that this argument is not absolutely conclusive, and it might still be urged that the importance of the certificate is such as to necessitate the inclusion of prime-movers in the Act. It is however necessary to determine.—

(a) what qualifications are necessary for a boiler attendant ?

(b) what grade of attendant should possess such qualifications ?

19. The ordinary type of boiler used on land does not consist of

Requirements of a Boiler Attendant.

complicated mechanism, with the exception of certain tubular boilers which will be considered later. Apart from upkeep and the

quality of the water supply, the safe working of a boiler requires a knowledge of three important facts, the level of water, the pressure of steam and the fire which converts the water into steam. The stoking of the ordinary type of boiler does not require theoretical training and efficient stoking is the duty of the

but of serious a

water should be maintained at a certain level ; this is indicated in the water gauges. It is accordingly necessary that the gauges should be carefully watched ; this requires care, not learning. Some knowledge of the feed pump is desirable, but in the absence of such knowledge, it is merely necessary to know that, if the water falls below a certain level, the fires must be drawn. The pressure of steam in the boiler is shown on the pressure gauge ; there are ordinarily two safety valves on the boiler, both of which are set by the Inspector to blow off automatically, when the maximum pressure allowable is reached. It is extremely improbable that both the safety valves and the pressure gauge should be out of order at the same time and it is only when the boiler attendant st

the safety valve pressure, keep of a boiler the principal consideration is efficient and sufficient cleaning ; this must depend on the quality of water used, by which the rate at which

scale is formed in the boiler is regulated; accumulation of scale is a frequent cause of accidents to boilers. Such knowledge can only be gained by actual experience of individual plants, and it has been admitted before us that the certificated engineer in India has ordinarily not the requisite knowledge for ascertaining the probable rate of formation of scale by chemical examination of the water used. It has been admitted by all technical witnesses, whom we have examined, that the repair of boilers is a profession in itself and should never constitute part of the duties of the boiler-attendant or engineer. It will thus be seen that the essential requirements of a person-in-charge of a boiler are such as are gained by experience and not by technical training. In the evidence that we have heard the strongest supporters of the certificate system have admitted that they place more reliance on experience than on the possession of a certificate. The above remarks cannot, it is true, be applied to complex types of water-tube boilers; such boilers are, however, used solely in large installations, the value of which is so great as to ensure the retention by the owners of a staff technically capable of maintaining them in a thorough state of efficiency. The necessity of certificated engineers in such cases has not been seriously argued before us.

The anomaly of certificated engineers for large boilers. 20. Accidents to boilers are ordinarily due to two causes:—

- (a) corrosion or fracture of the plates due to wear, tear and impure water,
- (b) collapse of furnaces due to insufficient water, or accumulation of scale or other matter.

The first cause is sufficiently guarded against by the present system of inspection; the second cause is one that can be guarded against only by the carefulness of the person in immediate attendance on the boiler. It is an anomaly that, in provinces where certificates are required by law, a certificate is required for the man in immediate charge of a small boiler, while in the case of large boilers the actual work on the boiler may, so far as the law is concerned, be done by the most ignorant coolies, devoid of all experience. In the case of large boilers where first or second class engineers are required, the certificated man is in supervising charge. As a matter of actual practice he is in charge of the boilers and the machinery, and in actual fact, as the evidence has shown conclusively, his attention to the boilers is confined to a few cursory visits to the boiler-house in the course of each day. We have it on evidence that he is seldom, if ever, present at the time when steam is being raised—the time when the occurrence of an accident is the most probable. The certificated engineer is merely a convenience to the owner—a convenience due to the fact that at present there is no other source, from which mechanical engineers, capable of taking charge of machinery, can be obtained. We consider that under the present system of certificates there is no actual safeguard against the occurrence of explosions in large boilers. We have further shown that in the case of large as well as small boilers the essential requirements are such as can only be gained by practical experience—requirements for the existence of which no certificate

can be proof. No examination or certificate can guard against the person in charge falling asleep during his period of duty.

21. The case against the certificated engineer does not, however, stop

**Defects in the training
for certificates.**

here. It is doubtful whether the present system

of training and examination tends to produce the right type of man—it certainly possesses

the damning disadvantage of effectually preventing the illiterate or semi-literate man from ever attaining to the charge of anything but the smallest boiler. We have on the other hand been strongly impressed by the type of engine-driver produced by the Royal Indian Marine and the Indian Railways, a type drawn from this very class which the certificate system effectually prevents from advancement in the charge of other boilers. The present first or second-class engineer is drawn from the educated classes, and in the majority of cases has undergone a course of training in a Technical Institute; we do not wish to enlarge on the obvious defects of such training—the almost complete subordination of practical to theoretical training. It is now possible for a student of the Victoria Technical Institute at Bombay to obtain an engineer's certificate after a few months' practical experience in shops, possibly without the benefit of any practical experience of a boiler. The effect of these certificates on mechanical engineering training may perhaps be outside the sphere of our enquiry, but it is important to note that, although the inducement offered by the certificate may result in increasing the number of students, the fact that the certificate gives a certain means of livelihood has effectually nipped in the bud any aspirations to complete the course in mechanical engineering, and has thus placed a certain check on the outturn of mechanical engineers in the true sense of the term. We do not however put forward this argument as a conclusive proof against the necessity of certificates. Actual experience has proved these conclusions to be well founded; even the strongest supporters of the certificate system have admitted that the product of the Technical Institute is merely an "arm chair" engineer, that he is there to give orders and to fulfil the requirements of the law, but that practical work is beyond his sphere. Other evidence has been still more outspoken and has shown that it is not a rare occurrence for the owner to retain an uncertificated and legally unqualified practical man to attend to his boilers, while a certificated engineer exists in addition on the establishment merely for the purpose of satisfying the requirements of the law.

22. Certain radical defects have already been pointed out in the present system of certificates—such defects

**Discussion of the system
of certificated persons
in charge.**

are general, but not exhaustive. In the Punjab, for example, the standard of examination has been lowered owing to the failure of a sufficient

number of candidates to pass the test. In Bombay the necessity of employing certificated men to hold charge of agricultural boilers has been relaxed in order to avoid the imposition of an excessive

tax on small industries. A further defect was pointed out by the Indian Industrial Commission, that the possession of a certificate is a fictitious value to its holder and makes it more expensive to employ him on small installations. We are doubtful if there is much force in this contention: it applies, it is true, to the instance of agricultural boilers in Bombay; it applies to instances where an uncertificated man is in actual charge and a certificated man is required in addition to fulfil the requirements of the law; it would also apply in such areas as Assam, where the boiler attendant is ordinarily drawn from the ranks of the ordinary cooli labour, and any increase in salary necessary might result in a general demand for a rise in the scale of wages. In all provinces where the system is in force, however, with the exception of the Punjab, the supply of certificated men is greater than the actual requirements, and this excess of supply effectively limits wages (except perhaps in the case of the requirements of the very smallest installations) approximately to their real market value. It is, however, obvious from the amount of evidence that we have heard in its favour that the system must have certain advantages. These advantages may be summarised as follows:—

- (i) A certificate is an assurance that a competent person is in charge of the boiler.
- (ii) A certificate is the only practical test by which the small owner can select a boiler attendant
- (iii) The existence of a certificate tends to afford a strong hold over incompetent men.
- (iv) Boiler engineers of the 1st and 2nd class are capable of supervising other machinery, and their retention is accordingly advantageous to the owner, and finally
- (v) The certificate relieves the owner of responsibility in case of accidents.

To the first argument we do not under the present system of certificates ascribe much importance; the force of the second we admit, and while realising that the small owner requires some assistance in the selection of a boiler attendant, we do not think the argument sufficiently strong to justify the compulsory possession of a certificate; in paragraph 25 we suggest an alternative. The third argument is reasonable, but the power now existing has very rarely been used in practice, and the advantage to the public safety would not be commensurate with the degree of interference to industrial liberty involved in the system. The fourth and fifth arguments are of the popularity of the system.

It is impossible, we observe that it is the past, to treat a Boiler Inspection Act as a means of securing training in mechanical engineering; we reserve our further remarks for paragraph 25. To the final argument, however, we take the strongest exception. It has been openly and honestly stated before us on more than one occasion, that the

appointment of a certificated engineer shifts the responsibility in case of an accident from the owner directly to the engineer and indirectly to Government. It does not seem that such a claim has any legal justification; if that were the case, the system of certificates must be condemned root and branch. The engineer, whether certificated or not, is an employee and subject to the orders of the owner. Instances are not rare in which the owner has refused to carry out the advice of a certificated engineer regarding the cleaning or repairing of his boiler, and any decrease in the owner's sense of responsibility must be attended by unfortunate consequences for the development of industry.

23. It is not easy to assess the respective merits of persons-in-charge of boilers in provinces where certificates are required and in those where the owner is free to make his own selection. It is not safe to rely on statistics of accidents; for there is no assurance of complete or uniform record; but it appears that accidents have been no more frequent in Bengal and Madras than in other provinces. Explosions are so rare in India, that they furnish no ground for comparison. 10 years ago, the engineer! There f boiler engineers and attendants are lower in Bengal and Madras than in the rest of India. In Bengal it is true an original advantage may have been derived from the existence of a large number of European engineers for training purposes. So great however has been the industrial development of other areas recently, that this advantage has now been discounted. In only one province have we been able to obtain comparative evidence on the respective merits of the two systems. In the area of the Punjab notified under the Act, certificates are required; in the remainder of the province they are not. The evidence recorded shows clearly that the men in charge of boilers in the unnotified area are at least no less efficient than their brethren in the notified area—this evidence is supported by the fact that there is no demand for certificated men in the area excluded from the Act. This evidence received very strong support from an officer of the Irrigation Department in the Punjab, who employs men of both categories. The absence of certificates in such unnotified areas and in provinces where certificates are not required appears to have resulted in the training up of a class of boiler attendant of a more practical and suitable nature—the type that is excluded by the certificate rules in other provinces.

Difficulties arising from abolishing the certificate system. 24. It has been maintained that if the necessity of possessing a certificate is abolished, it will be—

- (a) difficult to find persons competent to take charge of boilers;
- (b) impossible to provide for the present certificated men;
- (c) difficult to know the qualifications of men appointed, and
- (d) customary for owners to employ the cheapest type of labour procurable in areas where certificates are now

The first two points are closely connected, but it seems obvious that for several years to come the present supply of certificated men will be available for employment, if they are, as is maintained, really efficient at the work. There is further no reason to believe that a good class of boiler attendant will not be gradually trained up in the rest of India, as has been the case in Bengal and Madras, and, as Sir Alfred Chatterton informs us, in Mysore. In fact we have had evidence to show that such a class already exists in most parts of India; and even in Burma, where the existence of such a class might have been doubtful, evidence was given by two small mill owners that they had in their employment persons fully competent to take charge of boilers, but unable to do so on account of absence of certificates. It has further been maintained that if certificates are dispensed with, it will be necessary to provide, temporarily at least, for such students as are at present under training. We are unable to see the force of this argument; the training referred to is one for mechanical engineering generally; this offers ample scope for the successful student and includes the care of boilers, from which our suggestions do not debar any competent engineer. The third point is one in which we have much sympathy for the small owner; we do not think that it is unreasonable of him to expect a modicum of assistance in selecting men for working boilers, over which Government must insist on a somewhat severe degree of control; our views are stated at greater length in paragraph 25. The fourth argument is one that we cannot endorse; it was argued before us in many places, especially in Bombay, that if certificates were abolished, the small owner would employ the cheapest form of labour available, regardless of its qualifications and of the great expenditure of money that would be involved by the rapid deterioration of the plant; it was consistently maintained, in spite of a somewhat drastic cross-examination,

"... of a Rs. 5,000 plant in order to
his wages bill; it was further
f actual loss due to inefficient

labour would not result in the employment of a superior type of labour. This certainly has not been the experience in areas where certificates are not required by law, and we are not prepared to accept the suggestion that there is so essential a difference in character between the small owner in Bombay and in other parts of India. Bombay in fact has furnished us with an important example, which disproves its own contention. It has already been mentioned that the owners of small agricultural boilers in Bombay are exempted from the necessity of employing certificated attendants; if the Bombay contention were true, it would not be unreasonable to assume that these boilers would be placed in charge of the cheapest labour available. This has, however, not been the case; an inspection of these boilers, undertaken two years after the issue of the orders dispensing with the compulsory employment of certificated attendants, showed that in almost every instance

in Burma we have had
in any circumstances
the boiler owner would consider first not the cheapness but the efficiency of his labour. There are, we think, no grounds for presuming that abolition of certificates would lead to the employment of an inferior type

of labour, or that the results in Bombay would be in any way worse than they have been in Bengal and Madras.

25. We have not dealt with other aspects of the problem—the immobility of labour arising from the fact that a certificate granted in one province may be inoperative in another; the difficulty is one that could easily be guarded against by unification. The difficulties of the owner in remote areas due to the death, disappearance or illness of the certificated attendant, calamities of no uncommon character, which would necessitate the closing down of the plant, are too obvious to require a detailed description. We admit that a certificate may be of considerable value to the owner if granted as the result of a really practical training; we do not admit that a certificate for a boiler attendant is of such importance, with a view to the prevention of accidents, as to make it compulsory to limit the owner to the employment of certificated men, whatever may be the value of the certificate granted. There is a vast difference in the distinction between compulsory employment in the interests of the public safety and optional employment in the interests of the owner; the latter aspect is one which does not come within the scope of the Act. There is no doubt that the certificate system has been of immense value in the past, when the use of steam machinery was in an embryo stage, it has trained up a class of engineers, many of undoubted efficiency, for whom training would otherwise, in the existing state of training for mechanical engineering, have been impossible. The system of training and examination is however, defective, and, moreover, out of place in a Boiler Inspection Act. We do think, however, that the owner should be afforded an opportunity, if he so desires, of securing men whose qualifications can be known by a diploma or certificate. There is undoubtedly an increasing demand for qualified mechanical engineers. The new Act is not, however, intended to be an educative medium and we would put forward a very strong plea for the urgency of improving the present system of training of mechanical engineers and of instituting a system that will result in a satisfactory diplomas or certificates to engineering studies.

26. We accordingly recommend that the provisions of law requiring the employment by owners of boilers of certificated attendants should be repealed, and have accordingly excluded from the draft new Act all references to such certificates. We consider that efficient inspection, in the control of which we suggest considerable improvements, should normally be sufficient to guard against accidents. We have, however, drafted two special provisions, one in the law, the other in the rules, which should result in efficient management of boilers. In the law [section 13 (b)] we have entered a provision, already existing in a somewhat similar form in the current Bengal Act, empowering the Chief Inspector to withdraw or refuse to renew any certificate for a boiler, the condition of which is such as to show that it is not in charge of a competent person. In the rules we have drafted provisions requiring Chief Inspectors to issue for the use of boiler owners and attendants a series

of simple special instructions regarding the use and care of boilers; these will be hung up in the boiler house and will remove any excuse of ignorance of what is required for the proper working, care, and upkeep of the boiler.

III.—Proposals for New Legislation.

27. In paragraph 10 the lines on which the draft Act has been framed have been indicated; four definite recommendations have already been made; firstly, that prime-movers should be excluded from the Act; secondly, that the provision of law requiring the person in charge of a boiler to possess a certificate should be abolished; thirdly, that steam-pipes should be liable to inspection, and finally that the Act should extend over the whole of every province in India. We have attempted to base the new draft Act so far as possible on the provisions of existing Acts, as adapted to the requirements of the new system that we propose. It is now necessary to describe in some detail the main features of the proposed system, and explain the changes proposed from systems at present in force. The description may be divided under the following heads:—

Important features of proposed new system.

- A.—Definition of a boiler and liability of boilers of different classes to inspection.
- B.—System of control and status of inspecting staff.
- C.—System of registration of boilers.
- D.—Legal provisions for the inspection of boilers.
- E.—Accidents.
- F.—Appeals.
- G.—Omissions from existing Acts.

A.—Definition of a boiler and liability of boilers of different classes to inspection.

28. It has already been noted that, excepting the Boiler Explosions Acts, no English Act attempts to define a boiler; in India on the contrary every province has defined a boiler in its Act, each one in a different way. The resultant differences are great. An examination of the control over the use of vessels designed for the generation of steam under pressure; the steam thus generated is ordinarily used as the propelling force for a prime-mover; occasionally, however, it may be used for other purposes, e.g., for steaming wood or for filling a steam container. The original Acts were designed to cover boilers used for industrial or quasi-industrial purposes, e.g., vehicular and locomotive boilers. The definitions of boilers have, however, ordinarily been so loosely worded that in application they have included many types of vessels which they were not

intended to cover. In Burma, however, the definition has been expressly amended in order to include steam containers, and so wide is its operation that a large part of the time of the inspecting staff is absorbed in inspecting vessels, from which no serious danger can reasonably be apprehended; in fact so wide is its operation that a blockage in the spout of an ordinary steam kettle would render that utensil liable to inspection under the Act. Under every existing definition, excepting one, the smallest toy boiler would be liable to the provisions of the Act, and in four provinces the child-owner should, under the existing law, possess an engine-driver's certificate. The evidence has strongly supported the view that a definition should be framed to cover the intention of the original Boiler Acts in India and that any wider extension of the scope of the Acts is unnecessary and might tend to be obstructive to industrial freedom. Such a definition would exclude vulcanisers, the internal inspection of which is in any case impossible, autoclaves, digesters, and other forms of steam containers. Only in the case of one class of boiler have doubts been raised regarding the advisability of exclusion under the proposed form of definition, *viz.*, boilers used for heating water for domestic purposes. Such boilers are not ordinarily used for making steam purposely, and the pressure at which they work is ordinarily not higher than atmospheric pressure. In such cases no danger exists, but an instance was brought to our notice of such a boiler in which a 60 foot head of water resulted in a pressure of about 30 lbs to the square inch—a pressure at which an explosion would cause considerable damage. Such an instance, however, is exceptional, and is, in our opinion, insufficient to justify the inclusion of domestic boilers, the inspection of which would entail a vast increase in the inspection staff, within the scope of the Act. The definition contained in the Bombay Act of 1917, at the passing of which the points raised in this paragraph were fully considered, has accordingly been adopted in the new draft Act with a brief addition to secure the exclusion of toy boilers and other boilers of very small capacity from the provisions of the Act. It should be noted that this definition renders unnecessary—a fact not realised in Bombay—the clause in existing Acts, excluding boilers used exclusively for domestic purposes at atmospheric pressure.

29. In paragraph 12 we have recommended that all boilers, falling under this definition, should be liable to the provisions of the Act, wherever situated, but have entered a provision in the Act (section 4) permitting the exclusion of specific areas for exceptional reasons. It is now necessary to qualify this general inclusion by referring to certain classes of boilers, the majority of which have been excluded by the provisions of existing Acts.

(i) *Boilers used upon, or appertaining to, a railway.*—This exclusion follows the provisions of the existing Acts, which have entered a provision in the Act (section 4) permitting the exclusion of specific areas for exceptional reasons. It is now necessary to qualify this general inclusion by referring to certain classes of boilers, the majority of which have been excluded by the provisions of existing Acts.

Draft Section 3(a). follows the provisions of the existing Acts, which have entered a provision in the Act (section 4) permitting the exclusion of specific areas for exceptional reasons. It is now necessary to qualify this general inclusion by referring to certain classes of boilers, the majority of which have been excluded by the provisions of existing Acts.

by excluding stationary, as well as
vinces, however, stationary boilers are inspected by railway officials, who are appointed Inspectors under the Acts—an empty formality which we condemn in paragraph 30. A very small minority of the witnesses has

attempted to condemn the exclusion of railway boilers from the provisions of the Act, on the ground that it places railway companies in a privileged position. With this contention we cannot agree. The number of boilers used on a railway is so great and the organisation of a railway is such as to necessitate the retention of a special boiler inspection staff, and we are fully satisfied that the inspection work is thorough and efficient; it is further apparent that, were the Boiler Inspection Department to be responsible for the inspection of locomotive boilers, a degree of co-operation would be required to which it would be impossible to attain in practice. Considering the qualifications and organisation of the railway boiler inspection staff, we have no hesitation in making them fully responsible for the inspection of all boilers used upon, or appertaining to, a railway.

(ii) *Boilers in steam vessels and steamships.*—In recommending the exclusion of such boilers we are merely following the existing practice, and have taken the

Draft Section 3(b). opportunity to define the nature of such boilers with greater accuracy. It has, however, been brought to our notice that, in the case of certain non-passenger carrying vessels, boilers are not liable to any form of inspection. This is clearly a defect in the Inland Steam Vessels Act, and any remedy required should be obtained by an amendment of that Act. Subject to this qualification it is clear that the provisions necessitating a marine survey are sufficient to dispense with any further inspection by the Boiler Inspection Department.

(iii) *Boilers under the control of the Royal Navy (including the Royal Indian Marine).*—This proposed exclusion is new. At present such boilers are not

Draft Section 3(c). liable to inspection under the general exclusion of Government boilers. All boilers on vessels belonging to the Royal Indian Marine are, however, liable to a marine survey, for the purpose of which an expert inspection staff is retained. In view of this fact we propose that the Royal Indian Marine should be made responsible for the inspection of all boilers, both land and marine, under its control.

The majority of the existing Acts contain a specific provision for the exclusion either of such classes of boilers generally, or of such vehicular boilers as the Local Government may specify. This provision appears to be unnecessary now that a definition of a boiler has been framed which can be of general application. The reference to vehicular boilers was necessitated by the existence of boilers of the flash type, such as are used on the White Steam Car; these boilers will be excluded by the provision in the definition excluding boilers of less than 5 gallons capacity. No provision for such exclusions has accordingly been made in the draft Act.

30. It has been ruled that none of the existing Acts are applicable to boilers, the property of the Crown. As a matter of fact in certain provinces, e.g., the Punjab and the Central Provinces, Government boilers are considered liable to inspection under the Act, and officers of the departments concerned are vested with powers as Inspectors under the Acts. Such officers do not ordinarily possess the requisite knowledge or

experience, and the actual inspection is made by subordinates, possessed usually of fewer of the necessary qualifications. Such a system is liable to grave abuse and is little more than a means of avoiding the provisions of the Act. It is true that, under very exceptional conditions, we have recommended such a practice in Baluchistan; as a general method of procedure, however, we are of opinion that the practice should be abolished. In provinces where the Act is not considered to apply to boilers, the property of the Crown, it is ordinarily the practice that the Boiler Inspection Department is requested to inspect the boilers; in other cases no inspection is made; while in others a special inspection staff is retained for the purpose. Such a mixture of systems cannot be satisfactory. An instance was reported to us in which some Government boilers were made over to an engineering firm at Karachi for certain war work; the firm requested that the boilers might be inspected before use, but was informed that, being Government boilers, no inspection was necessary. A private inspection by the firm proved that some of the boilers were unfit for use. There is no ground for the supposition that a Government boiler is likely to be subject to more careful or efficient use than one belonging to a private individual, and no reasonable case can be advanced for excluding them from the provisions of the Act. Following the analogy of the Indian Factories Act, we have accordingly framed a section (Section 31), making the Act applicable to boilers the property of the Government. The section have proposed that the Local power to suspend the operation of the

We further recommend that all G

to inspection in the ordinary course by the Boiler Inspection Staff, and that only in very exceptional circumstances, where a department owns a large number of boilers in a compact area, should a special staff be retained by the Department concerned.

31. In framing the Act we have proceeded on the assumption that

Suggested exclusion of other classes of boilers

any boiler working above atmospheric pressure is a dangerous implement regardless of the place where, or the circumstance under which, it is used. Excepting the classes to which specific reference has already been made, little responsible evidence has been produced in favour of the exclusion of other classes of boilers. On the contrary the evidence has proved conclusively the value attached to inspection even in the case of boilers which are under expert control. From the owner's point of view it is stated that inspection keeps the engineer up to the mark and gives the owner a more complete assurance of the work of the engineer; from the engineer's point of view it assists in compelling the owner to undertake repairs which otherwise he might decline to do. In the Punjab and Bombay, however, it was suggested that boilers used for agricultural purposes might be excluded from the operation of the Act on the grounds of difficulties of inspection and the expense to the owner. Practice has, however, proved that difficulties of inspection are exaggerated, and that with the abolition of certificated engineers the cost of inspection is trivial in comparison with the value of the boiler. With the abolition of certificated engineers, moreover, the assumption is that inspection becomes all the more necessary. It must

also be borne in mind that in agricultural areas boilers are less likely to receive adequate supervision, and must deteriorate more rapidly from the use of dirty, or otherwise injurious, water. We are confirmed in this conclusion by the British Board of Trade statistics, which prove that explosions are of most common occurrence amongst boilers used for agricultural purposes. In the Punjab it was further suggested that small boilers of less than 6 or 10 nominal horse-power should be excluded from the operation of the Act. To clinch the argument a witness cited the difficulties of inspection of the boiler of a peripatetic merry-go-round. It would appear, however, that in the instance quoted the position of the boiler is such that an explosion would cause the maximum amount of injury to the greatest number of persons. The argument for exclusion, however, is generally unsound. The explosion of a boiler working at anything above atmospheric pressure may result in extensive damage and loss of life, and it is an indisputable fact that the small boiler generally is under less efficient control and management than boilers of large size. The abolition of any safeguard that may have been provided by the certificated driver renders the necessity of inspection still more imperative. It is true that in the Punjab the definition of a boiler excludes those of less than 50 gallons' capacity. This exclusion is, however, unsound in principle and excludes boilers such as those on fire-engines—boilers over which inspection and control is important.

B.—System of control of and status of inspecting staff

32. Under the Acts now existing two main systems for the appointment and control of the inspecting staff exist. **Present system of control by Government.** In the one, control is in the hands of Government which appoints the Inspectors, who accordingly constitute a Government service. The Inspectors are subordinate, either under the Acts, or more ordinarily by rules framed under the Acts, to a Chief or Senior Inspector whose authority is but loosely defined. General administrative control is vested either in the Director of Industries, in the Public Works Department, represented by the Sanitary Engineer as in Madras, or, as in Bombay, in the Collectors of Districts. In paragraph 34 we put forward definite proposals for a revised system of control, and it is only necessary to note briefly the disadvantages of the congenies of sub-systems under the main system of Government control. In the first place, the Chief or Senior Inspector, except in Bombay and the United Provinces, is vested with such shadowy powers that his position is little superior to that of an Inspector; if the uniformity at which we aim is to be anything more than nominal it can only be attained and retained by a system of Chief Inspectors, exercising actual and effective control over the subordinate staff. Control by Collectors is open to even graver condemnation; not only does it connote a complete absence of technical supervision over work of a highly technical nature, but it accentuates the divergences that must result from multitudinous control; in fact to such an extent have we been impressed by the evidence on this subject that, excepting the power to call for a boiler certificate under section 15 of the draft Act, we propose to divest the District Officer of all authority

under the Act. The results of control by the Public Works Department have not impressed us favourably. In Madras, for example, where the work is sufficient to justify the employment of a Chief Inspector and five Inspectors, we find that for some time the strength of the inspection staff has—unavoidably it is true—been reduced to two. Despite this fact, a large proportion of the Chief Inspector's time is absorbed in assisting the Sanitary Engineer in work entirely unconnected with boiler inspection, while the Inspectors are required to inspect water-works plant throughout the province. This must necessarily be to the detriment of boiler inspection work.

33 Under the other main system of control, the appointment and control of the inspection staff is in the hands of a Boiler Commission, composed of officials and non-officials; this system was initiated under the original Bengal and Bombay Acts of 1864 and 1869. The existing Bombay Act has jettisoned the system, and the Government of Bengal has at present under its consideration proposals for abolishing the Commission, the constitution of which under the Act of 1879 is of doubtful legal validity. Only one other province, namely Burma, has adopted the system which still remains in force in name in that province. The origin of this system was due to the desire to conciliate public opinion at the inception of an Act, which must by its nature be generally unpopular. Under this system, it should be noted, the inspecting staff does not constitute a Government service. In Burma there does not appear to be any particular opinion in favour of the Commission; in fact, as an executive controlling body, it has in practice ceased to exist; the actual control is exercised by the Secretary to the Commission, an officer of the Royal Indian Marine, who now holds a position more analogous to that which we suggest should be held by the Chief Inspector than is held by any officer of the department except in Bombay. In Bengal much of the evidence in favour of the Commission appears to be due to resentment at the strictures made by the Public Services Commission. "The present system", ran the report, "by which in certain places representatives of the interests to be inspected have a voice in the management of the inspection department is unsound, and should be abolished". Theoretically the correctness of these remarks must be admitted; in practice we need only note that there is not the slightest doubt regarding the fairness and impartiality with which the Commissioners have exercised their control—a result due largely, no doubt, to the value placed by the owner on inspection. At the same time it must be admitted that, while the attitude of the owner-commissioner may be and in control of the work gainsaid that moreover, been

impressed by three strong practical objections to the continuance of such Boiler Commissions. In the first place, it is impossible for such Commissions, constituted as they are, to sit continuously. This involves delay; if the Act is to be administered with true regard to the requirements of industry it is essential that decisions and consequent action must be prompt. Secondly, we have been strongly impressed in Bengal

with the poor quality of the work done by Inspectors; this cannot be ascribed to any other cause than lack of real and expert supervision. Thirdly, we feel convinced that the existence of a controlling Commission must so seriously impair the authority and responsibility of the Chief Inspector as to render the position of such an official at least an unenviable one; and so convinced are we of the necessity of raising the status of the Chief Inspector, that we think that this objection alone should prevail. It is unnecessary to criticise the status of the President's

argued that strong valid technical official as the le of which consists of experts. Whether an Indian Civilian stationed at Rangoon, or a Commissioner of Police, whose authority is limited to the town of Calcutta, is a suitable administrator for an Act, which, as we have suggested, should extend over the whole of each province, is a different question; their continuance is an anachronism, dating from the time when the Acts did not extend beyond the towns. The President of the Bengal Boiler Commission advanced before us a spirited defence of the present system; with the greater part of his argument we are in complete agreement. His argument, however, was based on the value of the Boiler Commission as an advisory and conciliatory body, and he referred to cases in which the advice of non-officials, experts and leading men of industry, has been of inestimable value—to cases in which there may be disputes over the interpretation of the regulations or friction between the industrial community and the inspection staff. We trust that disputes over the interpretation of regulations will be avoided by the enforcement of the uniform regulations which we submit with this report; there is no doubt that such disputes in the past have been due to the differences existing between the regulations in force in different provinces and to the fact that the regulations in all provinces are obsolete and do not apply to all existing types of boilers. These causes of dispute we trust we have eradicated. With regard to friction between inspectors and inspected, or other an official to deal with unsupported, of the Director of Industries, or e the correct body to consult. The value of the work of an Advisory Board in this respect cannot be overestimated, and for that reason we would lay especial stress in the importance of placing the Boiler Inspection Department under the control of the Director of Industries.

34. In section 5 of the draft Act we have laid down statutory pro- the

Proposed system of
control.

ing staff is subject to the orders of the Local Government. This provision is due to the fact that under the existing scheme of constitutional reform the administration of the Act devolves upon Provincial Governments. The scheme that we propose is a body of Inspectors appointed by Government under the supervision of a Chief Inspector; these appointments are laid down definitely in the Act. We further

propose that the Chief Inspector should work under the administrative control of the Director of Industries. The duties of Inspectors are prescribed in the Act and in the draft regulations and rules framed under sections 27 and 28 of the Act. So far as their duties are concerned no changes of importance are proposed, but the Inspectors are placed more fully under the control of the Chief Inspector, and all powers of making alterations in existing and renewal boiler certificates are withdrawn, and placed in the hands of the Chief Inspector; the reasons for this are so obvious as not to require recital. The alterations in the status of the Chief Inspector are of such importance that we deal with them in a separate paragraph 35. The proposal to place the Director of Industries in administrative control has been generally accepted, except in Madras; we need merely note that the Department of Industries is the one most closely concerned with mechanical engineering, in which boiler inspection plays a most important part, that boiler inspection is most intimately connected with industrial progress, and that the Directors of Industries' Advisory Boards, as has been remarked in the preceding paragraph, are the most suitable bodies for the performance of those important advisory duties, formerly performed by Boiler Commissions, and of such value for the smooth and harmonious working of the Act. The argument was advanced in Madras that the administration of the Act in the past by the Public Works Department through the Sanitary Engineer has been successful, that the Director of Industries is not a mechanical engineer, and that he is in charge of transferred subjects only, whereas the administration of the Boiler Act is a reserved subject. These arguments are, however, not conclusive; that portion of the Public Works Department which controls the Boiler Act has been transferred under the control of a Minister; the Director of Industries, if not himself in the future a mechanical engineer, will be assisted by mechanical engineering advisers and, though we concur in the necessity of technical control in Madras over the Chief Inspector as he exists at present, the improvement that we propose in the status of Chief Inspectors should dispense with the necessity of anything except administrative control. Further, the control of the Sanitary Engineer over the important Boiler Inspection Department must considerably interfere with his own important duties, and has in the past, as we have shown, resulted in burdening the Chief Inspector and Inspectors of Boilers with duties wholly unconnected with boiler inspection. Finally, we cannot concur with the Madras point of view that the administration of the Act by the Public Works Department has been entirely successful; the Madras Boiler Inspection Rules are in part obsolete, in part fundamentally wrong, and their administration has been so inelastic as to result in more difficulties with importers and users of boilers than in any other province. We realise that the administration of the Act must be left to Provincial Governments, but the warning should not be neglected that, where any change in the Act or regulations is required, the opinion of a Provincial Government is not likely to carry the same weight where administration is in the hands of a separate department, as in the case of provinces where the Act is administered uniformly by Directors of Industries and the administration is subject to discussion at periodic conferences.

35. The Public Services Commission recommended that there should

The status of the Chief Inspector.

be "one officer in each of the larger provinces who should be responsible for the effective working of the inspection staff. He should be called either a Chief or First Inspector according as the work to be done is on a large or small scale". Subject to slight modifications and considerable development, we endorse these recommendations. Action indeed has been taken in name in all provinces in which a Boiler Act is administered, and Chief or Senior Inspectors are now in existence in seven provinces. Their powers and legal authority in most provinces have not however, been defined; their qualifications are rarely sufficient for the duties which we propose to impose on them, while in Bengal and Burma their sphere of activity is closely limited by the existence of Boiler Commissions; in fact in Burma the appointment is purely nominal to meet the suggestions of the Public Services Commission in name. We are very strongly of opinion that, if the uniformity that will be introduced by the new Act and Regulations is to be maintained, a tightening up of the present system of administration is essential. As will be seen in paragraphs 38 and 39, we propose instituting by specific provision of law a new or rather revised system of uniform registration of boilers for the whole of India, which will fix the pressure at which the boiler may be used in any part of India. A perusal of section 8 of the draft Act and of part II, section I of the draft regulations will show that the whole responsibility will rest on the Chief Inspector. If registration is to be uniform the personal equation must be eliminated as far as possible, and the registering authority must be confined to the smallest possible number of persons. We propose that the Chief Inspector should be held responsible for the proper administration of the new Act and regulations; that discovery of defects and proposals for their removal should be a recognised part of his duties; we propose to vest him under section 10 with certain appellate powers—powers only exercised now by the Chief Inspector in the United Provinces; we propose throughout to increase his powers and make him fully responsible for the working of the Act. Our proposals are based on the system at present in force in Bombay—a system far superior in its form and in its results to any other that we have examined. On the Chief Inspector will rest the duty of fixing the maximum pressure of a boiler, of altering the pressure, of those that are below the standard withdrawing certificates, and of which we suggest for him under the Act, regulations, and rules will be a heavy and responsible controlling officer, free from all without the existence of such in working of any all-India Act and regulations will be impossible. If this decision be accepted it follows that the present average type of Chief or Senior Inspector must go; the post must not be one open to the Inspector in the ordinary course of promotion; it requires special and superior qualifications; it requires a higher status, which will naturally involve. Our terms of reference do not cover the of service of Chief Inspectors, but we

would put forward the suggestion that, to avoid difficulties regarding pay and promotion and to ensure a greater uniformity in administration, the service should be an all-India one, and Chief Inspectors should be liable to transfer from one province to another.

36. It may be argued that our proposals are a counsel of perfection, and that in practice the smaller provinces could not afford to pay the salaries required. We have, however, carefully considered this aspect of the problem. It must be remembered that we propose the abandonment of the necessity of employing certificated engineers largely on the grounds that efficient inspection is sufficient to ensure the safety of a boiler. The Chief Inspector will be the keystone of this system of efficiency, and the smaller provinces will be necessa-

control of a single Chief Inspector; thus Baluchistan might be yoked with Bombay; Assam with Bengal, and Bihar and Orissa with the Central Provinces and Berar; while the United Provinces, the Punjab, Delhi, and the North-West Frontier Province might constitute a single group. Of the two alternatives we favour the latter; under the former it is not improbable that boiler inspection work might suffer at the expense of the other interests of the Chief Inspector, a result which we have already remarked to have been achieved in Madras.

37. It has been suggested to us that our proposals might prove insufficient to ensure the uniformity, which it is now proposed to introduce into the Act and regulations, and that it might be advisable to appoint an Inspector-General of Boilers for all India. We hardly think that such an appointment would be essential, and it would in any case be inconsistent with the theory of administration of the Act by Provincial Governments. Much must depend on the selection of the right type of man as Chief Inspector, and the assurance would be greater if it were possible to arrange for the transfer of Chief Inspectors between provinces. We are further of opinion that uniformity of administration may be maintained by the discussion of difficulties at periodic conferences of Directors of Industries—provided that all provinces agree to place them in administrative control and, if necessary, by annual conferences of Chief Inspectors. It would, however, lead to facility in subsequent administration if, at the time of the introduction of the new Act, regulations and rules, an experienced mechanical engineer were appointed to advise all Provincial Governments and to assist in the proper initial organisation of the reformed system.

C.—System of Registration of Boilers.

38. It is clear that some form of registration of boilers is an essential preliminary to an efficient system of inspection. It is prescribed by law in several provinces, and in all provinces a rough method of registration

is in force, ordinarily prescribed by rules framed under the Act; in no case, however, are the legal provisions sufficient to attain the end that we have in view, and in practice Bombay alone has a system very closely resembling the present proposals. Our main object in insisting on a somewhat complex system of registration is to ensure uniformity in the working of the new Act and regulations throughout India, and to give that uniformity a practical value in the case of boilers which may be used in more than one province. In Bombay a system has been introduced under section 5 of the Act which requires at the time of registration a complete survey and measurement of the boiler, on the basis of which the original maximum pressure at which the boiler may be worked, is fixed. The details and results of this survey are entered in a special memorandum book, which constitutes a test of, and check on, all subsequent inspections. We now propose to develop this system, to amalgamate the original survey and registration into a single process, to be known as registration, and to make the results of this registration in any province valid over the whole of India. The legal basis for registration has been laid down in section 5 of the draft Act; the procedure has been prescribed in the draft regulations, part II, section 1, and certain administrative instructions have been formulated in part IV of the rules framed under section 28 of the draft Act. Under section 27 (d) of the draft Act the main instructions are contained in regulations to be framed by the Government of India owing to the great importance of maintaining uniformity in registration. It must be remembered that the original inspection of a boiler before use in India differs entirely from subsequent inspections prior to the renewal of an existing certificate. The main object of the original survey or inspection is to ensure that the boiler complies with the standard conditions for the material, design, and construction of boilers; the object of subsequent inspections is to discover whether the maximum pressure permissible as a result of the original survey should be maintained or reduced as a result of deterioration or wear and tear due to bad care and management. It will thus be seen that there is no inconsistency in distinguishing between the original and subsequent inspections.

39. Our proposals are briefly as follows. Whenever it is proposed that a boiler shall be used for the first time in India the owner will be required to apply for registration, forwarding with the application certain prescribed drawings and specifications of the boiler. The boiler will then be subjected by an Inspector to a detailed measurement of all its parts; these measurements will be entered in a Memorandum of Inspection Book in a prescribed form in which calculations for the maximum working pressure permissible will be entered. The Memorandum of Inspection Book will then be forwarded to the Chief Inspector for orders under section 5 of the draft Act preparatory to the final fixing of the pressure and the issue of the original certificate. A copy of this book will be retained as a permanent record in the office of the Chief Inspector, while the original book will be maintained as the Inspector's Inspection Book. It will be noted that, with this information at hand, it will be possible to maintain a very close control

over the work of inspection. We further propose that, whenever a boiler is transferred from one province to another, it shall be accompanied by the Registration Book, and for this purpose provisions have been drafted, necessitating a report of all transfers of boilers, and that any certificate in force at the time of transfer, based initially on such a Registration Book, shall remain in force for the period originally granted, subject only to an examination for the detection of any damage that may have been caused during the period of transit. This system will dispense with new registration at the time of transfer, and will ensure the acceptance in one province of the same maximum pressure that has been allowed in another, thus largely avoiding differences due, apart from differences in regulations, to the personal equation in inspection. It is obvious that the measurements prior to registration require considerably more work and time than the ordinary inspection entails, and we have accordingly proposed that a special scale of fees—higher than those fixed for annual inspections—should be charged for registration. In view of the great advantages which the owner will derive, mainly in case of transfers of boilers, the majority of the witnesses examined have accepted the necessity and justice of this increased scale.

40. The advantages of this uniform scheme of registration have been almost universally recognised; it will enable the importer to register a boiler at the time and place of import with the assurance that it will be able to work at the pressure then fixed to whatever part of India it may be sent. In the case of the purchase or sale of a boiler, the uniformity of pressure permissible adds a guarantee of great importance to the transaction. Only two objections have been raised against the proposed system. It has been suggested that a thorough examination would still be necessary after the transfer of a boiler on the grounds that an Inspector in the transferring province might be induced to certify a higher pressure than the rules permitted, as his responsibility would then cease, and that damage, hitherto undetected, might come to light when the boiler was unseated. The first ground is based entirely on experience of the system at present in force, and is, we think, sufficiently guarded against by the fact that under our proposals the pressure of a boiler cannot be increased except under the orders of the Chief Inspector, and that the Registration Book maintains a complete and continuous history of the condition of each boiler. In the second ground there may be some force, and accordingly in section 9 (4) of the draft Act we have entered a provision authorising a fresh inspection during the continuance of a certificate. In a commercial transaction this will enable the vendee to insist on the vendor obtaining a fresh certificate for a boiler, after it has been unseated, immediately before the completion of the sale. The other objection raised was to the effect that, where a boiler has been manufactured by a recognised firm of boiler makers, or where a boiler is imported, supported by the certificate of a Boiler Insurance Company, no fresh survey or measurement is necessary. With these contentions we cannot agree. Every Chief Inspector will be responsible for regulating

the working of each boiler at such maximum pressure as will ensure against the occurrence of accidents; if his responsibility is to be complete he must be responsible for the measurements and calculations on which he fixes the maximum pressure. It is an admitted fact that few boilers correspond exactly with the specifications and drawings according to which they are constructed; a difference of $\frac{1}{32}$ nd of an inch in the thickness of a plate—a difference that would not be unusual—would result in considerable variations in the calculations; a plate, rolled nominally to the thickness of $\frac{1}{16}$ ths of an inch, may not have been evenly rolled. The certificate of an Insurance Company would be of still less value; their ordinary methods of inspection are not in accordance with the regulations that will henceforth be prescribed, nor must it be forgotten that, in the case of a boiler for which the company retains no financial responsibility as in the case of boilers imported into India, the certificate of a company, which exists for the purpose of insurance, cannot be one of sufficient reliability. It is important in our opinion that the responsibility for fixing the maximum pressure should rest on the Chief Inspector.

D.—Legal Provisions for the Inspection of Boilers.

41. In the provisions of the draft Act relating to the actual inspection of boilers only two changes in principle have been made. The one change has already been explained in paragraph 34; the Inspector will be authorised merely to renew a certificate without any alteration in the terms thereof; any alterations whether in period or pressure, and any proposals for structural alterations or repairs will require the sanction of the Chief Inspector. The other change proposed is an attempt to reconcile the existing law with present practice. In all existing Acts the Inspector is required by law to inspect a boiler within a certain period from the receipt of the application; the actual periods are as follows:—

Bengal	14 days.
Bombay	4 days or 20 days, if no Inspector has been appointed
Madras	7 days in the city, 30 days in other areas
United Provinces	30 days.
Burma	7 days in towns, 21 days in other areas
Punjab	30 days.
Central Provinces	20 days

It is *prima facie* obvious that with inspections extending over the whole of a province it must be impossible, without the entertainment of an abnormal staff, to ensure inspections, boiler by boiler, within the periods fixed. It is further a matter of doubt, what legal responsibility

would attach to the Boiler Inspection Department were an explosion to occur after the expiry of the prescribed period, but before an actual inspection had been made. This method of fixing the period within which an inspection must be made is a survival from the original Boiler Inspection Acts, when the Acts were confined to the towns and it was necessary to exercise strict control over the inspecting staff, which did not constitute a whole-time service. Assuming that a single Inspector is able to inspect from 350 to 400 boilers per annum under present conditions, it would clearly be impossible for him to perform this programme over an area of say, 10,000 square miles, if he were compelled to arrange his programme in the order in which sporadic applications were filed. As a matter of fact, the provision of law is a dead letter in practice. In areas where seasonal factories exist it is obviously essential to inspect either at the close, or just before the commencement, of the working season. It is important that inspections should be made at the convenience of the owners; in any whole battery of boilers out of action for inspection purposes at the same time. As a matter of practice, inspections are now arranged, without any complaints, to suit the convenience of boiler-owners and to facilitate the work of the inspecting staff. It is, however, essential, if no period within which inspection must be made is prescribed, that some provision should be laid down in the Act similar to proviso (b) of section 6 (1) of the Bombay Act, to enable a boiler to be used after the expiry of the period of the certificate if inspection cannot be made by the due date. In section 9 (3) of the draft Act we have framed a provision enabling the owner to continue to use a boiler until inspection has been made, provided that he has otherwise complied with the provisions of the Act, and subject to certain conditions under which a certificate would *ipso facto* cease to be valid. No period has been prescribed within which inspection must be made after the date of application, and the responsibility for ensuring systematic and speedy inspection will now rest on the Chief Inspector. The law relating to inspections contains no other changes of importance.

E.—Accidents.

42. In section 2 (a) a definition of an accident has been laid down, as under the existing law an accident appeared to exclude an explosion.

Procedure in case of accidents.

No radical alterations have been proposed in the law relating to the report of, or enquiry into, accidents. We have, however, proposed that in the case of serious accidents the enquiry should be in the hands of the Chief Inspector, and have laid down a statutory provision relating to the issue of renewal certificates in case of accidents. We also propose that the law should apply to accidents to steam-pipes as well as to boilers, and have extended the period within which an accident must be reported from 12 to 24 hours in accordance with experience gained from the working of the present law. In section VI of the model rules framed under section 28 of the draft Act a provision has been entered allowing for the enquiring into serious accidents by the Chief Inspector in conjunction with some other person appointed by the Local Government. This proposal

is based on the Commissions appointed to enquire into explosions in the British Isles under the Boiler Explosions Act—a provision of undoubted value in case of serious accidents.

11.—Appeals.

43. The existing system of appeals differs to a bewildering extent in different provinces. In Bengal the appellate authority constituted by law is a person appointed for the purpose by the Local Government either alone or assisted by two experts as assessors; in practice appeals, if heard at all, are heard by the whole of the Boiler Commission.

Constitution of appellate bodies.

In Bombay appeals are heard by Commissions consisting of an indefinite number of persons. In Madras the Presidency or District Magistrate constitutes the appellate authority for the area within his jurisdiction with the assistance of two competent assessors. In the United Provinces the Chief Inspector constitutes the first Court of appeal, a further appeal being allowed to the Sanitary Engineer or an officer specially appointed for the purpose, assisted, if he thinks fit, by two assessors. In the Punjab one or more persons may be empowered to hear appeals. Burma relies on a panel consisting of two or more members of the Boiler Commission, subject to a second appeal to the Local Government, while in the Central Provinces each District Magistrate hears appeals, assisted by one or more assessors, a second appeal lying in certain circumstances to the Divisional Commissioner. In actual practice the number of appeals filed is extremely small, one in the Punjab in the past six years and two in Bombay in the last 12 years being typical. It is, however, essential that some provisions should be laid down for the filing and hearing of appeals. The first essential of an appeal under the Act is that it must be decided with the least possible delay; for in most cases in which an appeal would be filed the boiler would remain out of use pending the decision of the appeal. It is accordingly necessary that the system should be one that will ensure a speedy hearing. The second essential is that the appellate body must consist of expert mechanical engineers; for there are few appeals that do not arise from the decision of technical matters and, as the appeal will be against the order of the Chief Inspector—an engineer under the system that we have proposed of special qualifications—it is essential that the appellate body should consist only of the best experts available. In view of the improved status of the Chief Inspector we propose to follow the system in force in the United Provinces and give to the Chief Inspector appellate powers over the orders of Inspectors; in section 19 of the draft Act we have accordingly adopted section 29 of the United Provinces Act with a few verbal alterations. In section 18 of the draft Act powers have been given for the view of law.

In part VII of the Model Rules framed under section 25(f) of the draft Act, we have suggested a system that should be at the same time expeditious and efficient. In view of the paucity of appeals it is

probable that a single appellate authority would suffice for each province; it is extremely improbable that there would be a sufficient number of qualified mechanical engineers of sufficient experience to constitute an appellate authority except near the most important centres.

An appellate authority should be constituted for each province, and an additional court might be located at the capital of each province. The President of the court should be an officer possessing judicial or magisterial experience, and that the court should consist of three expert mechanical engineers; we suggest the number three in order to avoid requiring the President to give the casting vote, where a difference of opinion may exist, in technical matters of which he is likely to have no knowledge. In order to avoid delay in constituting the appellate court we suggest that each Local Government should constitute a panel of expert mechanical engineers from whom three can be immediately selected at the time of the hearing of an appeal. Witnesses have unanimously accepted the system of appeal which is outlined above.

G — Omissions from existing Acts.

44. It is necessary to indicate briefly important omissions from existing Acts which have not been referred to in the report. The Bengal, Madras, and Central Provinces Acts call for no special comment.

The only important omission from the Burma and Punjab Acts is the authority given to issue a certificate for a boiler on the report of the certificated engineer without further inspection; this provision is obviously inconsistent with the purport of the Act, and has naturally been excluded with the abolition of the provision necessitating the employment of certificated engineers. From the Bombay Act a considerable amount of detail has been omitted, part of this has been relegated to the regulations and rules; part has been totally omitted as covering details for which no legal provision is necessary. Much the same applies to the United Provinces Act—an Act otherwise admirable. Particular attention is called to provisions in Chapter VII of that Act; section 36 is covered by the provisions of the Indian Penal Code relating to public servants; section 37 appears to enter into much unnecessary detail. In section 47 certain important provisions exist which do not find place in any other Act, namely, the power to extend the Act not only to prime-movers, but to internal combustion-engines, cylinders of vessels used for containing, but not for generating steam, or to any class or description of such machinery. This question has largely been dealt with in this report in discussing the inclusion of prime-movers and the definition of a boiler. It is further obvious that the use of internal combustion engines would be anticipated from them.

Such a proposal has not been advanced in any other province, and in our opinion no case has been made out for inserting a provision, making it possible to extend the provisions of the Act to any form of machinery excepting steam-boilers and steam-pipes as defined in the draft Act.

IV.—Proposed new Regulations.

45. In the preceding paragraph it has been noted that a considerable amount of detail has been relegated to regulations and Rules framed under the Act—provision for this has been made in sections 27 and 28 of the draft Act. As has been previously noted, a sharp distinction has been drawn between the regulations and the rules. The regulations refer entirely to technical matters and to procedure in which homogeneity is essential in order to ensure the uniform working of the Act; these regulations, it is proposed, will be framed by the Government of India; this proposal is unanimously supported by the evidence recorded. The rules refer to questions concerning the administration of the Act; they have been framed as model rules for the guidance of Local Governments, which will have the power to alter them in accordance with the decision that the administration of the Act will be in the hands of Local Governments. The general system on which the regulations and rules have been framed has been described in paragraphs 10 and 11 of this report. It is now necessary to enter into further details regarding the methods which have been employed in drafting them.

46. Part I of the regulations lays down the standard conditions for the material, design, and construction of steam-boilers; these are of fundamental importance; for it is on the basis of these conditions that it is decided whether a certificate can be issued for the use of a boiler and, if so, at what maximum pressure the boiler can be worked. In paragraph 10 we have stated that these standard conditions have been based on the latest Board of Trade Regulations for Marine Boilers, viz., Standard Conditions for the Design and Construction of Marine Boilers, 1920. In adapting these regulations for land boilers in India the evidence of a large number of mechanical engineers has been taken, and a conference of mechanical engineers was also held in Calcutta; the lines on which the regulations have been adapted have followed the decisions arrived at at the conference (*vide* appendix IV) and are supported by most of the technical evidence recorded. It must be remembered that practically all boilers used in India are imported from Europe or America; boilers have, however, been constructed in India from materials imported from abroad, and the construction of a large steel-plate rolling-mill by the Tata Steel and Iron Works at Jamshedpur makes it probable that before long boilers will be constructed in India from material manufactured in India. It has accordingly been necessary to frame the regulations in such a manner as to cover boilers constructed in India from materials manufactured in, or outside of, the country. In order to satisfy ourselves regarding the conditions under which steel plates would be manufactured we visited the Tata Steel and Iron Works. We are satisfied that steel can be manufactured up to the standard laid down in the Board of Trade Regulations; and we are further satisfied that the steel is manufactured under supervision and subject to tests, sufficient to entitle it to most favoured treatment under the regulations. In adapting the Board of Trade Regulations provisions have been inserted to ensure their applicability to land boilers of all types.

47. In appendix I B the proposed standard conditions have been printed with explanatory notes, wherever important differences from the Board of Trade Regulations exist, in order to avoid the necessity of detailed explanations in the report. It is, however, necessary to refer to two matters of importance, the one of form, the other of principle. The former refers to the type of "formula" adopted in the regulations. In all existing provincial rules and in previous Board of Trade Regulations formulæ were recorded in extended form, i.e., in such a manner that each formula was self-explanatory. The new Board of Trade regulations have abandoned this principle and have adopted condensed formulæ, each formula being "boiled down" to the least possible number of ingredients; such condensed formulæ are not self-explanatory, as without detailed calculations it is impossible to estimate how various figures have been arrived at. Provided that the formula is correct, however, there is no necessity that it should be self-explanatory; and the condensed type of formula has the great merit of being clear and brief. We have accordingly adopted the Board of Trade method. The other matter is one of considerable importance. It has been maintained that when once satisfactory standard conditions have been laid down, no new boiler should be licensed for use in India, unless it conforms to these standard conditions. In theory it must be admitted that this argument is correct; in practice, however, it would work with considerable hardship. There is little doubt that, when once a satisfactory uniform standard has been prescribed for the whole of India, there will be a strong tendency for boiler manufacturers to conform to that standard. here a boiler may be imported which onform to the prescribed standard, but a pressure somewhat lower than the pressure for which it was designed. Following the decision of the Calcutta Conference and the great majority of the evidence, we propose that such boilers should be permitted to be used, but only at such reduced pressure as would be allowed under the conditions that have been laid down in the draft regulations. We would add that in the regulations we have proposed special favourable conditions for boilers that are constructed and the material for which is tested under the supervision and inspection of a recognised inspecting authority. We further propose that the new conditions should not be applicable until one year after the passing of the Act, to allow for the completion of boilers now constructed or under construction.

48. The general provisions of those parts of the regulations dealing with steam-pipes registration and Inspection of boilers have already been sufficiently described in this report. We propose that the fees for registration of a boiler should be fixed uniformly for the whole of India in the regulations in order to avoid objections that might be raised by importers if a different scale were fixed in different provinces. The fees for inspection will, however, be fixed under the rules by each Local Government, doubtless with regard to the cost incurred in administering the Act. Fees in all provinces are at present fixed on the basis of the

nominal-horse power of the boiler or prime-mover. If the prime-mover is ruled out, it will be found that every province calculates nominal-horse power by a different method, the method being ordinarily based on the area of the fire-grate of the boiler. Thus, while Bombay divides the fire-grate area by 3, Bengal calculates the nominal horse power of a similar boiler by multiplying the fire-grate area by 2. It is obvious that the term "nominal horse-power" has in reality no precise meaning; however important it may have been in the days of Watt, it has no applicability to the modern type of high pressure boiler, and there is accordingly no reason in retaining a term that has become a flagrant misnomer. It is true that the term is still used by certain boiler manufacturers, but instances have been brought to our notice of complaints made by owners of boilers on the ground that the nominal horse-power calculated by the Boiler Inspection Department has differed from that given by the manufacturer. Considering that the term has no real connotation, this is perhaps not surprising. In abolishing this meaningless term we have the support of all the technical witnesses examined. It is still, however, necessary to devise some means of classifying boilers in order to fix the registration and inspection fees for different classes and sizes of boilers; it would clearly be inequitable to mulct the owner of a small vertical boiler in the same fee that is demanded from the owner of a large Lancashire boiler. The fire-grate area of a boiler is not a satisfactory basis as the area can be altered without difficulty. It is essential that the basis for calculation should be simple to enable the owner to file the requisite correct fee in accordance with the Act at the time of his application for registration. We have accepted the principle that the fee should be calculated approximately on the basis of the heating surface to the amount of work involved in entering into a minute calculation of the heating surface of different types of boilers—a calculation also required for regulating the areas of safety-valves—has been laid down, and a scale of charges for registration of boilers has been framed, classifying boilers under seven heads on the basis of the area of the heating surface. In order to avoid any misapprehension in the use of the term "heating surface", as in the case of nominal horse-power, we propose to adopt the term "boiler rating". The classification is required for no other purpose except the fixing of registration and inspection fees.

V.—Proposed Model Administrative Rules.

40. In paragraph 11 of this report we have indicated the intended application of the model rules to be framed under section 28 of the draft Act, and the manner in which they have been drafted. It is not intended that these rules should be in any way binding on Local Governments, but they will serve to show in what manner the draft Act may be administered, according to the intention with which the Act has

been framed. The rules regarding accidents and appeals have already been referred to in paragraphs 42 and 43 of the report. The remaining rules call for no special comment.

50. In conclusion we would draw attention to a fact which is perhaps not strictly within the scope of our duties. **Necessity of efficient staff.** Whatever system may be introduced for the purpose of improving the effects of inspection, whatever Act may be framed for the purpose of enforcing that system, success cannot be expected unless the staff employed is capable of performing the duties assigned to it. Special stress has been laid on the necessity of employing Chief Inspectors possessing special qualifications. But the necessity of employing efficient Inspectors is no less important. Many provinces are at present unable to recruit up to the required strength because they are unable to attract men possessing the requisite qualifications on the salaries that they are prepared to offer. In one province at least the evidence tends to show that the exiguity of the salary offered has resulted in increased, though unsanctioned, charges on the boiler owner. In most provinces the department has been run at a profit; this is not the object of the Act, and the profit might with advantage be used for improving the emoluments of the inspecting staff. If that were insufficient, no objection would be raised to a small increase in the scale of charges. There are only two points to keep in view—the employment of an efficient staff, and the preservation of the fair name of the department.

F. D. ASCOLI, *President*

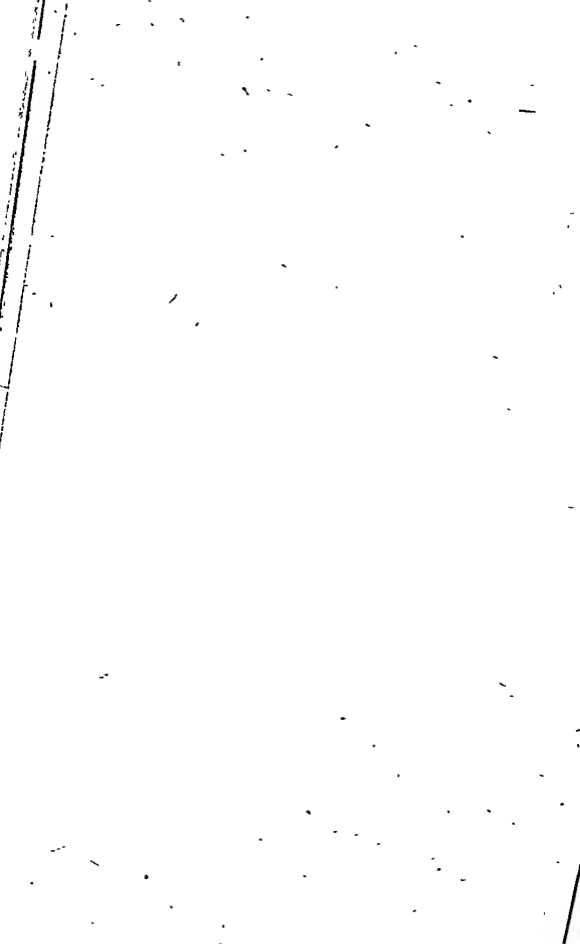
D R MACINTOSH } *Members.*
D B MANN. }

The 10th March 1921.



APPENDICES.

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APPENDIX I-A.

A Bill to consolidate and amend the law relating to Steam Boilers in India.

Preamble.

Whereas it is expedient to consolidate and amend the law relating to Steam Boilers; it is hereby enacted as follows.—

Short title.

1. (1) This Act may be called the Indian Boilers Act, 1921.

Extent.

(2) It extends to the whole of British India, including Baluchistan and the Santhal Parganas.

Commencement.

The proviso is necessary for the administration of the Act. The period of grace before enforcing the Regulations will be entered in the Regulations.

(3) It shall subject to the provisions of section 7 come into force on the first day of 1921

Definitions.

New, but necessary; in the former Acts accidents appear to exclude explosions by mistake.

2. In this Act unless there is anything repugnant in the subject or context:—

The Bombay definition; this definition does away with the clause excluding boilers used for domestic purposes at atmospheric pressure—a fact not previously realised in Bombay. The definition is explained in the report. The limit of 5 gallons is entered in order to exclude toy boilers from the operation of the Act and to exclude small boilers of the flash type.

(a) *Accident* includes an explosion of or any damage to a boiler or steam-pipe which is calculated to weaken the strength thereof or to cause it to be liable to explode

(b) *Boiler* includes any closed vessel exceeding five gallons in capacity used expressly for generating steam under pressure for use outside such vessel and any mounting or other fitting attached to such vessel which is wholly or partly under pressure when steam is shut off.

The Bombay and most complete definition.

(c) *Inspector* means any person appointed under this Act to be an Inspector.

(d) *Owner* includes any person using a boiler as agent of the owner thereof, and any person using a boiler which he has hired or obtained on loan from the owner thereof.

(e) *Prescribed* means prescribed by regulations or rules framed under this Act.

New; required by the exclusion of prime-movers and the decision to apply the Act to the inspection of steam-pipes.

(f) *Steam-pipe* includes only the main pipe or pipes through which steam passes directly from a boiler or boilers to a prime-mover or other first user

3. Nothing in this Act shall apply to any boiler or steam-pipe—

(a) used upon or appertaining to any railway within the meaning of that word as defined in section 3, clause 4 of the Indian Railways Act, 1890;

(b) in any steam vessel as defined in section 5, clause 2 of the Inland Steam Vessels Act, 1894, or in any steamship as defined in section 3, clause 1 of the Indian Steamships Act, 1884.

(c) under the control of the Royal Navy.

4. The Government of India may by notification in the *Gazette of India* exclude any local area from any or all of the provisions of this Act.

5. (1) A Local Government may at any time appoint such persons as it thinks fit to be Inspectors under this Act, and shall appoint one of such Inspectors to be Chief Inspector.

(2) The persons so appointed shall, within such area as the Local Government may direct, exercise the powers conferred and perform the duties imposed on Inspectors by or under this Act or by regulations or rules framed under sections 27 and 28 of this Act.

(3) Every Inspector shall be deemed to be a public servant within the meaning of the Indian Penal Code, and shall be officially subordinate to such authority as the Local Government may prescribe by rule in this behalf.

6. An Inspector may at any time, within the local limits for which he is appointed, enter any place or building where he has reason to believe that a boiler is being used for the purpose of inspecting or examining such boiler and any steam-pipe attached thereto, or of seeing that the provisions of section 7 are being observed in respect of the boiler.

Limitation of application.

Central Provinces [3(a)], Bombay (3), Madras [11(4)], United Provinces [45(a)], Burma [1(4)], Distinguish Bengal (1) and Punjab [1(3)] which excludes only locomotive boilers on railways.

This is mainly a new and more precise draft of the old rules.

Exclusions.

This was not required before as former Acts usually referred to notified areas only. For reason *vide* report

Appointments.

The important point is the legal position of the Chief Inspector, *vide* United Provinces [3(1)], Bombay, [4(1)] The appointment is now made compulsory.

Powers.

Vide Madras [3(2)], United Provinces (5), Punjab [3(2)].

Status.

Adopted from the Factories Act [4(6)] This dispenses with special provisions regarding penalties for obstructing, etc., an Inspector in the discharge of his duties.

Inspector may enter building.

extent.

Prohibition of use of boiler.

This section has been considerably strengthened in view of the change in the method of registering a boiler. 7 (b) is quite new to cover transfers (vide report). 7 (a) is now explicit *Vide* Bombay 6 (1), United Provinces (10), Punjab 5 (1), Burma (6), Madras 4, Bengal 5, Central Provinces 4 (a). The provisos are new and are necessary for the administration of the Act. See also section 1(3) of this draft Act.

United Provinces 7 (e).

7. The owner of a boiler shall not use the same or permit the same to be used—

- (a) unless it has been duly registered in accordance with the provisions of this Act;
- (b) if it has been transferred from one province to another until the transfer has been reported in the prescribed manner;
- (c) unless a provisional order or a certificate authorising its use has been granted and is in force under the Act;
- (d) at a pressure higher than what is entered in a provisional order or certificate still in force;
- (e) if it has been declared by an Inspector to be in a dangerous condition while a certificate is in force.

Provided that any boiler registered, licensed or certified under any Act entered in schedule I shall be deemed to have been registered or certified under this Act,

Provided further that, in any local area in which registration or a certificate or license for the use of a boiler has not previously been required by law the provisions of this section shall not be in force until 12 months after the passing of this Act.

Boiler to be registered.

This section is largely new and is based on the distinction now drawn between original registration and renewal of certificates, but see Bombay 8

For 8 (1) *vide* Bombay 8 (1) and (2), Central Provinces, 5 (1) and (2), Madras 5 (1), Burma 7 (1), Punjab 6 (1), United Provinces, 11 (1) and (2).

Examination of boiler.

Madras 5 (2) and (3), Burma 7(2) and (3), United Provinces, 11 (3) and (4), Punjab 6 (2) and (3).

8 (1) The owner of any boiler, if he desires to use the same, shall, if it is unregistered, apply to the Inspector to have the same registered. Every such application shall be accompanied by such fee as may be prescribed.

(2) The Inspector shall after giving due notice under section 10 proceed to measure and examine such boiler and determine at what pressure it may be used. The Inspector shall also determine the condition of the boiler and the nature of the repairs required.

Orders of Chief Inspector.

(3) The Chief Inspector may—

- (a) refuse to register the boiler or permit it to be used absolutely, or until such alterations or renewals as he may direct have been made to such boiler;

(b) register the boiler and assign to it a registry number subject to any alterations or renewals to such boiler that he may deem necessary;

(c) order the issue of a certificate in the prescribed form authorising the use of such boiler for a period not exceeding 12 months at such maximum pressure as he may think fit.

(d) The Inspector shall forthwith convey the orders of the Chief Inspector in writing and issue any certificate ordered under section 8 (3) (c) to the owner of the boiler, who shall within the prescribed period cause the registry number to be permanently marked on such boiler in the prescribed manner.

9. (1) Any certificate granted under the preceding section or any renewal certificate granted under the provisions of section 11 shall be valid only for the period mentioned in the certificate provided that—

- (a) when any accident has occurred to a boiler or steam-pipe attached thereto as described in section 17,
- (b) when any boiler, not being a portable or vehicular boiler, has been moved; or
- (c) when any structural alterations, additions or renewals have been made to any boiler, or steam-pipe attached thereto;

the certificate shall be deemed to be no longer in force until the boiler or steam-pipe has been examined by the Inspector and certified for such period and maximum pressure as he may deem fit.

(2) The owner shall on or before the date of expiry of a certificate, or as soon as a certificate is deemed under the preceding subsection to be no longer in force, apply to the Chief Inspector for a renewal certificate. Such application shall be accompanied by the prescribed fee.

(3) Whenever the period of a certificate has expired the owner shall, provided that he has complied with the conditions of section 9 (2) and subject to the provisions of section 9 (1), be permitted to use the boiler at the maximum pressure entered in the former certificate, pending the issue of or the refusal to issue a new certificate or the grant of a provisional order under section 12.

(b) *Vide* Bombay 8 (2), Central Provinces 5 (3), Madras (9), United Provinces 11 (2).

Registration of boiler.

Bombay 8 (2), Central Provinces 5(3), Madras (9), United Provinces 11 (2).

Limitation of validity of certificate.

Conveys the meaning of all existing Acts but the proviso is mainly new, though essential. Bombay 9, United Provinces 14 and 11, Burma 7, Punjab 6, Central Provinces 6.

Owner to apply for renewal of certificate.

Is in accordance with existing Acts?

When certificate to remain in force.

Is most important to cover any delays that must occur in inspection, *vide* Madras 4.

This clause is new and is intended to provide for the not infrequent case of

Date to be fixed for examination of boiler.

Vide Bombay 10, Madras 5, Bengal 5, Punjab 6, Central Provinces 4 and 8.

Arrangements to be made by owner.
The details have been transferred to the regulations.

When examination to be refused.

Issue of certificate

Madras 5, 7 and 8, Bengal 6 and 7, Bombay 11, United Provinces 12, Burma 9, Punjab 8.

Vide Madras 6.

Vide United Provinces 16, Burma 8, Punjab 7.

(4) Nothing in this section shall be

10. (1) Whenever an application has been

at least 4 days notice of the date so given.

(2) On the date so fixed the owner of the boiler shall—

(a) afford to the Inspector all reasonable facilities for such examination and all such information as may reasonably be required of him ;

(b) arrange that the boiler is properly prepared for examination in the prescribed manner ;

(c) provide in the case of a boiler about to be registered such drawings, specifications, and certificates as may be prescribed.

(3) If the owner fails without reasonable cause to comply with any of the provisions of the preceding sub-section the Inspector shall refuse to make the examination and shall report the facts to the Chief Inspector who shall, unless sufficient cause to the contrary be shown, require the owner to file a fresh application and fee under section 8 (1) or 9 (2), as the case may be, if he intends to use the boiler. In such cases the provisions of section 9 (3) shall cease to apply.

11. (1) The Inspector shall on the date fixed examine the boiler in the prescribed manner and, if he is satisfied that such boiler and the steam-pipe attached thereto are in good condition, shall issue a renewal certificate therefor in the prescribed form for such period not exceeding 12 months and for such maximum pressure, as he thinks fit, in accordance with regulations framed under this Act, provided that if the Inspector intends—

(a) to issue a certificate for a lesser period than that applied for (not being more than 12 months) ;

(b) to increase or reduce the maximum pressure admissible ;

(c) to order any structural alterations, additions, or renewals to be made to the boiler or steam-pipe, he shall, within 48 hours of his examination, inform the owner in writing of his reasons therefor, and shall not issue a certificate until he has obtained the orders of the Chief Inspector.

(2) If in the opinion of the Inspector the boiler is not fit for use he shall, within 48

Refusal of certificate.
United Provinces 13.

12. (1) In the case of a boiler in respect of which no certificate has previously been granted, or in respect of which any structural alterations, additions, or renewals have been made or have been ordered to be made or in respect of which it is proposed to increase or reduce the maximum pressure permissible

Issue of provisional order.
Bombay 6 (iii) (a).

such maximum pressure as he may think fit, pending the receipt of orders for the issue of or the refusal to issue a certificate from the Chief Inspector.

(2) Such provisional order "shall be in force for a period not exceeding 6 months and shall be surrendered by the owner on receipt of the Chief Inspector's orders.

Surrender of provisional order.

13. The Chief Inspector may refuse to renew or may withdraw or revoke any certificate on the report of an Inspector, or otherwise—

Revocation of certificate.
Madras 11, Bengal 8, Bombay 17,
United Provinces 15, Burma 13, Panjab-
11, Central Provinces 12.

(a) if there is reason to believe that it has been fraudulently obtained or granted erroneously or without sufficient examination ;

(b) if the boiler in respect of which it has been granted has sustained injury or has ceased to be in good condition, or is not in charge of a person competent to have charge of it.

Alterations and renewals to be sanctioned.

Vide United Provinces 26, Madras 10 (3), Central Provinces 14 and Bombay 13.

14. No structural alterations, additions, or renewals shall be made to any registered boiler or steam-pipe unless such alterations, additions, or renewals have been sanctioned in writing by the Chief Inspector. The subso-

Inspector may dispense with the fee required by section 2 (2).

15. The owner of any boiler who holds a provisional order or certificate therefor shall at all reasonable times during the period for which such order or certificate is in force be bound to produce the same when called upon to do so by a District Magistrate or Commis-

Production of provisional order or certificate.

Bombay 21 (1), Madras 10 (1), Central Provinces 16 (1), United Provinces 17.

Police.

Transfer of provisional order or certificate.

Bombay 21 (2), Madras 10 (2), Central Provinces 16 (2).

Report of accidents.

Bombay 20, Madras 10-A, Burma 10 (1), United Provinces 28 and Central Provinces 15.

(Time for report altered.)

Information regarding accidents to be given.

Follows United Provinces exactly.

Conditions for issuing certificate after accident.

New; it is important that there should be a definite rule about certificates in such cases. For the proviso vide the Report.

Constitution of appellate authority.

Bombay 5.

Appeals to Chief Inspector.

United Provinces 20.

Vide Report.

Appeals to appellate authority.

Bombay 14, Madras 12, Bengal 9, United Provinces 31 and 32, Burma 16, Punjab 12, Central Provinces 9 and 10.

16. Any person who becomes the owner of a boiler during the period for which a provision is made in the Act shall

17. (1) If any accident occurs to a boiler or steam-pipe the owner or person in charge thereof shall, within 24 hours of the occurrence thereof, report the same in writing to the Inspector. Every such report shall contain a true description of the nature of the accident and of the injury thereby caused, sufficient to enable the Inspector to judge of the gravity of the accident.

(2) Every person shall be bound to

extent of the accident.

(3) No certificate shall be renewed or granted for such boiler under section 11 until such renewals or repairs as may be ordered by the Inspector have been carried out, provided that—

Whenever an explosion has occurred, or whenever in the opinion of the Inspector the accident is of a serious character, he shall report the facts to the Chief Inspector, and no renewal certificate shall be granted without the orders of the Chief Inspector.

18. The Local Government shall constitute by rules framed in this behalf an appellate authority for hearing appeals preferred by owners under section 20.

19. Any person considering himself aggrieved by—

- (a) an order made or purporting to be made by an Inspector in the exercise of any power conferred by this Act or by any regulation or rule made under this Act; or
- (b) a refusal by an Inspector to pass an order which he is required or entitled by this Act or by any regulation or rule made under this Act to make,

may, within 30 days from the date when such order is served upon him or such refusal is communicated to him or purports to have been made, appeal against such order or refusal to the Chief Inspector, whose decision, except as provided in the next succeeding section, shall be final.

20. Any person considering himself aggrieved by an order of the Chief Inspector, whether in original or in appeal,

- (a) refusing to register a boiler or to grant or renew a certificate to the owner of a boiler,

(b) refusing to grant a certificate for the full period applied for (not being more than 12 months) or for the maximum pressure desired,

(c) withdrawing or revoking a certificate,

(d) reducing the amount of pressure specified in any certificate or the period for which such certificate has been granted,

(e) ordering structural alterations, additions, or renewals to a boiler or steam-pipe

may within 30 days of the receipt of such order lodge with the Chief Inspector an appeal to be heard by the appellate authority constituted under section 18. The decision of the appellate authority shall be final.

21. Orders in appeals under sections 19 and 20 shall be communicated to and executed by the Inspector concerned and the Chief Inspector, respectively.

22. Any owner of a boiler who—

(a) makes any structural alterations, additions, or renewals to a boiler or steam-pipe without the orders of the Chief Inspector as required by section 14,

(b) refuses or neglects to produce a certificate when duly called upon so to do under section 15,

(c) refuses or neglects to surrender a provisional order as required by section 12 (2),

and any person who—

(d) refuses or neglects to make over to the new owner of a boiler a provisional order or certificate as required by section 16,

(e) tampers with a safety-valve of a boiler so as to render it inoperative or causes it to be loaded over the pressure entered in a provisional order or certificate in force for the boiler,

and every owner or person in charge of a boiler or steam-pipe who—

(f) fails to report an accident to a boiler or steam-pipe as required by section 17,

(g) or fails in any case to disconnect a boiler when any person is examining it or working therein in accordance with regulations framed under section 27 (g),

shall be punishable with a fine which may extend to Rs. 100 for each offence.

Execution of orders in appeals

This section has been inserted in order to cover apparent difficulties that have been experienced in executing orders in appeals.

Penalties for single offences.

Madras 21, Bengal 11, Bombay 31, 32, United Provinces 34, Burma 18, Punjab 14, Central Provinces 18 and 19.

Penalties for continuing offences.

Madras 21, Bengal 11, Bombay 31 and 32, United Provinces 31, Burma 18, Punjab 14, Central Provinces 18 and 19

23. Any owner of a boiler who uses the same or permits it to be used —

- (a) without a provisional order or certificate duly obtained and in force in respect thereof,
- (b) at a higher pressure than that allowed by a provisional order or certificate in force in respect thereof,
- (c) without reporting the transfer thereof from one province to another as required by section 7 (b)

shall be punishable with a fine which may extend to Rs. 500 and in the case of a continuing offence, with an additional fine which may extend to Rs. 100 for every day after the first in regard to which he is convicted of having persisted in the offence.

Penalty for tampering with registry mark.

Bombay 34, United Provinces 35, Central Provinces 20 and 21.

24. (1) Whoever removes, alters, defaces, renders invisible or otherwise tampers with a registry number marked on a boiler shall for every such act be punishable with a fine which may extend to Rs. 500.

(2) Whoever fraudulently marks upon a boiler a registry number which has not been duly allotted to it under the Act shall be punished with imprisonment which may extend to 2 years or with fine or with both.

Limitation of charges

Madras 22, Bengal 12, Bombay 37, United Provinces 40 and 39, Burma 19, Punjab 16, Central Provinces 24

This section follows existing practice as adapted to the proposed system

Offences by whom cognisable.

Bombay 36, United Provinces 39(2), Central Provinces 23.

Issue of regulations.

Madras 23, Bombay 38, United Provinces 41, Burma 21, Punjab 17, Central Provinces 25.

25. No charges shall be brought against any person for an offence under this Act unless the same is brought within the time specified in the Act.

26. No offences against this Act shall be cognisable except by a Presidency Magistrate or a Magistrate of the first class.

27. The Governor-General in Council may, by notification in the *Gazette of India*, issue regulations consistent with this Act for all or any of the following purposes —

- (a) for prescribing the technical duties of the Chief Inspector and Inspectors,
- (b) for laying down standard conditions for the material, design and construction of boilers;
- (c) for determining the maximum pressure at which a boiler may be used;
- (d) for regulating the registration of boilers, including the fee payable thereon, the drawings, specifications and certificates to be produced by the owner, the method of preparing a boiler for examination,

the form of the inspector's report, the method of marking the registry number, and the period within which such registry number must be marked on the boiler;

- (e) for regulating the inspection and examination of boilers and steam-pipes, and prescribing forms of certificates therefor;
- (f) for prescribing the material to be used for the construction of steam-pipes;
- (g) for ensuring the safety of persons working inside a boiler;
- (h) generally for the registration of boilers and the technical requirements of the Act.

28. A Local Government may, by notification in the official Gazette, *resue rules* for all or any of the following purposes:—

- (a) for prescribing the administrative duties of Chief Inspector and Inspectors, their salary, allowances and conditions of service, and the administrative control to be exercised over them;
- (b) for regulating the transfer of boilers;
- (c) for regulating the administration for registering and issuing certificates for boilers;
- (d) for prescribing fees for the issue of renewal certificates, and the method of determining such fees;
- (e) for regulating enquiries into accidents;
- (f) for constituting the appellate authority under section 18, its powers, the method of hearing all appeals and for levying costs in appeals;
- (g) for the method of payment and disposal of all fees, costs and penalties levied under the Act;
- (h) generally for carrying out the administration of the Act.

29. All regulations and rules made under sections 27 and 28, shall be made after previous publication, and when made shall be finally published in the Gazette, and shall come into force on such date as may be specified therein.

31. This Act shall apply to boilers and steam pipes belonging to the Crown.

(g) has been added to allow of provisions similar to Section 10(2) of the Bombay Act.

Issue of rules.

Madrās 23, Bombay 33, United Provinces 41, Burma 21, Punjab 17, Central Provinces 25.

Regulations and rules to be published.
Burma 21.

Recovery of fees, etc.

Vide Bengal 13, Bombay 39, Central Provinces 28
Public demand has been adopted in place of "arrears of land revenue."

Applicability to the Crown.
Factories Act, Section 54.
Vide Report.

Power to suspend in case of emergency.
Factories Act, Section 56
Vide Report.

Repeals.
Vide Factories Act, Section 59

32. In case of any public emergency the Local Government may exempt any boiler or steam-pipe from this Act to such extent and during such period as it thinks fit.

33. The Acts entered in Schedule I are hereby repealed, provided that all appointments made and all certificates given under the said Acts shall be deemed to have been made or given under this Act.

SCHEDULE I.

Act.

The Bombay Boiler Inspection Act (V of 1917) as amended to date.

The Bengal Steam Boilers and Prime-Movers Act (III of 1879) as amended to date.

The Madras Steam Boilers and Prime-Movers Act (III of 1893) as amended to date.

The Punjab Steam Boilers and Prime-Movers Act (II of 1902) as amended to date.

The Burma Steam Boilers and Prime-Movers Act (II of 1910) as amended to date.

The United Provinces Steam Boilers Act (III of 1915) as amended to date.

The Central Provinces Boiler Inspection Act (II of 1907) as amended to date.

APPENDIX I.-B.

Regulations framed by the Government of India under Section 27 of the Indian Boilers' Act.

ACT No. OF 192 .

PAGES.

PRELIMINARY.

PART I.

Standard conditions for the design and construction of Land Boilers.

SECTION I.—General Requirements and Conditions as to Material, Workmanship, etc.	63—64
SECTION II.—Materials of Construction	65—70
SECTION III.—Rules for Determining the Working Pressure to be allowed on various parts of Boilers	71—133

PART II.

Inspection.

SECTION I.—Regulations for the Registration and Inspection of Boilers	134—140
SECTION II.—Steam pipes	141



PRELIMINARY.

1. The following regulations for the inspection of land boilers and main steam pipes in British India, and for their material, design and construction, shall be applicable to all boilers registered after the first day of

Boilers registered before that date under the various Acts, and boilers in areas excluded from the operation of such Acts on that date, shall, as they stand, be deemed to comply with these regulations.

2. In Part I Inspector means, for material manufactured or boilers constructed, (a) in British India, an Inspector appointed by Government for the purpose, (b) outside British India an Inspector acting on behalf of any Inspecting Authority recognised as competent by the Government of India.

Part I.—Standard conditions for the design and construction of land boilers.

SECTION I.—GENERAL REQUIREMENTS AND CONDITIONS AS TO MATERIAL, WORKMANSHIP, Etc.

1. *Standard Requirements Material.*—All steel plates, rivets and bars, used in the construction of boilers must be tested and found to conform to the requirements of Section II.

Construction.—All boilers during construction shall be under the supervision of an Inspector.

Inspector's certificate.—For boilers imported into British India a certificate from an Inspecting Authority certifying that the material was tested and the boiler built under their supervision shall be furnished to the Chief Inspector before or with the application for registration. In the case of steel made and tested by well known makers in India or Great Britain, the certificate of the makers as prescribed in Clause 16 of Section II will be accepted in lieu of one from an Inspecting Authority.

Makers' Certificates under Section 10 (2) (c) of the Act—The following certificates shall be furnished to the Chief Inspector before or with the application for registration—

(a) a certificate of manufacture and test from the maker of the boiler.

such certificate
the works.

(b) a fully-dimensioned drawing or print showing a longitudinal section and end view of the boiler, and bearing the works number of the boiler and the maker's office stamp;

(c) a certificate or certificates from the steel maker and the maker of the plates, rivets or bars in accordance with Clauses 15 and 16 of Section II. The certificate of the steel maker must show the strength of the material in tons per square inch with their number and dimensions of the plates, rivets or bars. The certificate of the maker of the plates, rivets or bars must show the length on which the tests made and

Maker's stamp.—The boiler shall have stamped upon its front plate in a conspicuous position the following particulars:—

MAKER'S NAME.	
Works' number	Year of make
Tested to lbs	on
W P lbs	Inspector's initials or stamp of Inspecting Authority.

2. *Boilers not complying with Standard Requirements.*—Boilers not fully complying with the Standard Requirements may, with the approval of the Chief Inspector, be allowed to work at a lower pressure than would otherwise be permitted, but no structural part of a boiler made of Bessemer process steel or of cast or malleable cast iron shall be accepted.

Modification of Formula.—Under the Regulations for determining the working pressure to be allowed on various parts of boilers, the material (except where specifically indicated) to which the formula apply is steel complying with the requirements of Section II.

Where steel of a lower tensile breaking strength than the minimum required under Section II is employed, such minimum tensile breaking strength shall be

provided for in any formula, be the working pressure permitted.

For flat plates of copper, the working pressure as found from the formula, reduced by 50 per cent. shall be the working pressure permitted.

3. *Standard Specifications for Material.*—Standard specifications for steel, wrought iron and copper plates and bars, and for cast steel for firebox girders are in (except produced as in the

4. *Welded Steel plates*—No steel plates subject to a direct tensile stress are to be welded, except where the weld is covered by a
From "Standard Conditions"

5.

From Board of Trade
"Standard Conditions"

6. *Rivet Holes*—All rivet holes must be drilled "fair" and as far as possible they should be drilled in place. After drilling the plates the burrs should be removed, the facing surfaces of the plates cleaned and the sharp outer edges of the holes removed.

Where sizes of rivets are mentioned in the Standard Conditions the sizes refer to the diameters
From

7. *End*

From Board of Trade
"Standard Conditions"

8. *Hydraulic tests of New Boilers.*—In all new boilers working at pressures

From Board of Trade
"Standard Conditions"

hydraulic test pressure must be
square inch.

SECTION II.—MATERIALS OF CONSTRUCTION.

STEEL PLATES, RIVETS AND BARS.

(Based on British Standards.)

Section II is taken from the Board of Trade "Standard Conditions" except clause 16.

1. *Process of Manufacture.*—Structural steel for boilers shall be made by the Open Hearth process, acid or basic.

2. *Freedom from Defects.*—The finished material shall be free from cracks, surface flaws, and lamination. It shall also have a workmanlike finish, and must not have been hammer dressed.

3. *Testing and Inspecting.*—The following tests and inspections shall be made at the event of any of the material being put into boilers, such material shall be subjected to satisfactory testing, and such further tests of the material from the same charge may be made as the Inspector in attendance may consider desirable.

Plates.—Wherever practicable the rolled surfaces shall be retained on two opposite sides of the test piece. The elongation shall be measured on a Standard test piece having a gauge length of 8 inches.

Thickness the width of the test piece between $\frac{1}{4}$ inches; for material $\frac{7}{8}$ inch to $\frac{3}{4}$ inch in not exceed 2 inches; for material less than not be more than $2\frac{1}{4}$ inches. In other respects to the Standard Test Piece A of the British

Engineering Standards Committee.

Round Bars.—When used for test pieces, they shall be turned down to a convenient size and shall have a gauge length of 8 inches. The test piece shall be of the diameter of the test piece in diameter, and the resulting test piece is of the diameter may be used if the elongation will be required, as specified in Clause 6. When enlarged ends are used the length of the parallel portion shall be not less than $4\frac{1}{2}$ times the reduced diameter (Standard Test Piece F of the British Engineering Standards Committee).

Any straightening of test pieces which may be required shall be done cold.

5. *Mechanical Tests and Selection of Test Pieces.*—Plates and bars for boilers shall satisfy himself that the conditions shall be selected by

6. *Tensile Tests. Plates.*—The tensile breaking strength of steel plates for shells, gusset stays and girders, determined from Standard Test Pieces, shall be between the limits of 23 and 35 tons per square inch, but a range of not more than 4 tons per square inch. The tensile breaking strength of the test piece shall be not less than 23 tons per square inch. The tensile breaking strength of the test piece shall be not less than 35 tons per square inch.

square inch; and not less than 23 per cent. for material of $\frac{3}{4}$ inch in thickness and upwards required to have a tensile breaking strength between the limits of 26 tons and 30 tons per square inch.

be between
not less than
more than
for combus-
of 26 tons
it. measured

Where Stay Bars are tested on a gauge length of 4 times the diameter (Test Piece F) the elongation shall be 24 per cent. and 23 per cent. respectively.

The tensile breaking strength of angle and tee bars shall be between the limits of 28 and 32 tons per square inch, with an elongation of not less than 20 per cent. measured on the Standard Test Piece A.

For material under $\frac{3}{4}$ inch in thickness the elongation may be 3 per cent., but not more than 3 per cent. below the above-named elongations.

Wherever practicable the rolled surfaces shall be retained on two opposite sides of the test piece.

Rivet Bars.—The tensile breaking strength of rivet bars shall be between the limits of 26 tons and 30 tons per square inch of section, with an elongation of not less than 26 per cent. measured on the Standard Test Piece B, or 30 per cent. measured on the Standard Test Piece F. The bars may be tested the full size as rolled.

7. Number of Tensile Tests.—Plates.—One tensile test shall be taken from each plate as rolled. For plates exceeding $2\frac{1}{2}$ tons in weight one tensile test shall be taken from each end.

Angle, Tee, Rivet and Stay Bars—One tensile test shall be made from each 15 charge, but not bars rolled from section or diameter, these diameter and 8 respectively for

determining the number of tests required

Should a tensile test piece break outside the middle half of its gauge length, the test may, at the Maker's option, be discarded and another test be made of the same plate or bar

or cross-
small bars

tests.
mached
udged

In all cold bend tests, and in temper bend tests on samples 0.5 inch in thickness being doubled over until the internal radius is equal to $1\frac{1}{2}$ times the thickness of the test piece and the sides are parallel.
The test pieces shall not be cut is similarly annealed, in which uneously treated with the material

For both cold and temper bends the test piece shall withstand, without fracture, being doubled over until the internal radius is equal to $1\frac{1}{2}$ times the thickness of the test piece and the sides are parallel.

For small sectional material these bend tests may be made from the flattened bar. Bend tests may be made either by pressure or by blows.

9. *Number of Bend Tests. Plates.*—A cold or a temper bend test shall be taken from each plate as rolled. For plates exceeding $2\frac{1}{2}$ tons in weight one bend test shall be taken from each end.

bends above specified in the case of each plate which is above $3\frac{1}{2}$ tons per square inch.

Angle Bars.—A cold or a temper bend test shall be made from each angle bar rolled.

Stay Bars.—A cold and a temper bend test shall be made from every 15 stay bars as rolled from each charge.

10. *Tests for Manufactured Rivets.*—Rivets selected by the Inspector from the bulk shall withstand the following tests:—

(a) The rivet shanks are to be bent cold, and hammered until two parts of the shank touch, without fracture on the outside of the bend.

(b) The rivet heads are to be flattened, while hot, in the usual manner, without cracking at the edges. The heads are to be flattened until their diameter is $2\frac{1}{2}$ times the diameter of the shank.

11. *Additional Tests before Rejection.*—Should the test pieces first selected by the Inspector not fulfil the test requirements, two further tests of the same kind may be made, but should either of these fail, the plates or bars from which test pieces were cut shall be rejected. In all such cases further tests shall be made before any material from the same charge can be accepted.

12. *Branding*—Every plate and bar shall be clearly and distinctly marked by the maker in two places with an approved quality brand indicating that the material has complied with the required tests; and also with the number or identification marks by which they can be traced to the charge from which the material was made.

13. *Defacing of Rejected Material*—In the event of the material failing in quality beyond

system of marking the finished material to be given every facility for witnessing the required results of the test, he of the material for his

signature.

15. *Steel not over 2 1/2 tons*

in the works
for deputed to
which it was
of the charges
large shall be

16. *Maker's certificate.*—Before the mill sheets are signed, the Maker shall furnish the Inspector with a certificate guaranteeing that the material has been made by the Open Hearth Process acid or basic, and that it has been subjected to, and has withstood satisfactorily, the tests above described in the presence of the Inspector. The following form of

Certificate will be accepted if printed on each mill sheet, with the name of the firm, and initialled by the Test House Manager:—

"We hereby certify that the material described below has been made by the Open Hearth Process, ^(acid)_(basic), and has been satisfactorily tested in the presence of ^{your Inspector}_{our Test House Manager} in accordance with the Standard tests."

IRON PLATES, RIVETS AND BARS.

17. *Tests*.—If full allowance for iron shell plates, stay bars and rivets is required, the material must be tested in the same way as steel in accordance with the following requirements.

From Bombay Revised Rules based on Board of Trade and other British Engineering Authorities.

18. *Plates*.—The tensile breaking strength shall not be less than 22 tons per square inch with the grain and 20 tons per square inch across the grain. The elongation shall not be less than 16 per cent. with, and 10 per cent. across the grain.

19. *Rivet Bars*.—The
From Bombay Revised Rules based on Board of Trade and other British Engineering Authorities

tons per
27 per
32 per
the bars

From Board of Trade "Standard Conditions" for Steel Rivet.

20. *Tests for manufactured rivets*.—To be the same as for steel (See Clause 10)

From Traill's "Boilers, Marine and Land" other authorities and general practice.

21. *Stay Bars*.—The tensile breaking strength shall not be less than 21 tons per square inch, with an elongation of not less than 20 per cent. measured on the Standard Test Piece B or 25 per cent. measured on the Standard Test Piece F.

Special Iron for Screw Stays, for Fireboxes and Combustion Chambers.—In order that iron screw stays may be approved of the same size as would be required for mild steel the iron must withstand the following tests:—

From Board of Trade "Standard Conditions".

22. *Tensile Tests*.—The tensile breaking strength shall not be less than 21½ tons per square inch, with an elongation of not less than 25 per cent. measured on the Standard Test Piece B or 30 per cent. measured on the Standard Test Piece F.

23. *Bend Tests*.—Test pieces either of the bar as rolled, or turned down to 1 inch diameter, shall stand bending cold until the sides are parallel and the space between the two sides is not greater than the diameter of the test piece.

24. *Number of tensile tests*.—The bars as rolled are to be placed in batches of twenty, and one tensile test is to be taken from each batch. If this is unsatisfactory, two other bars are to be selected for test, but should either of these fail the batch is to be rejected.

25. *Number of bend tests*.—One ordinary bend test is to be taken from each batch and a similar test piece.

The batch is to be rejected.

In all cases the selection of the test pieces is to be made by the Inspectors.

COPPER PLATES, STAY AND RIVET BARS.

26. Tensile Tests. Plates.—The tensile breaking strength of copper plates for fire-boxes determined from Standard test pieces shall not be less than 14 tons per square inch with an elongation of not less than 35 per cent.

From Uawn's "Machine Design" and Hiller's "Steam Boiler Construction".

Stay and Rivet Bars.—The tensile breaking strength of copper stay and rivet bars for fireboxes shall not be less than 14 tons per square inch of section with an elongation of not less than 40 per cent. measured on the Standard Test Piece B.

27. Bend Tests. Plates—For either cold or red hot tests the test piece shall withstand being doubled over without fracture until the sides are touching and parallel.

From Hiller's "Steam Boiler Construction," see the Rules of the National Boiler Insurance Company.

28. Hammer Tests for Rods—A piece of rod or bar 1 inch in length shall withstand, without cracking at the edges, being hammered endwise until the length is reduced to $\frac{3}{4}$ inch.

CAST STEEL

29. Steel Castings—Steel for castings shall be made by the Open Hearth Process, acid or basic, and all such castings shall be thoroughly annealed at a uniform temperature and be allowed to cool down prior to removal from the annealing furnace. If subsequently heated with the Inspector's approval, they shall again be similarly annealed if required by the Inspector.

From Board of Trade and British Standard Specifications.

30. Tensile and Bend Tests.—If full allowance for steel castings for firebox or combustion chamber roof girders is required, they shall be tested as follows:—

Test pieces shall not be cut off until they have been stamped by the Inspector after the annealing has been completed.

32. Tensile Tests.—The tensile breaking strength of steel castings shall be between the limits of 26 and 40 tons per square inch, with an elongation of not less than 15 per cent. measured on the Standard Test Piece C, D or E (See Forms of British Standard Tensile Test Pieces)

33. Bend Tests—Cold bend tests shall be made upon test pieces having a rectangular section of 1 inch wide by $\frac{3}{4}$ inch thick. The test pieces shall be machined and the edges rounded to a radius of $\frac{1}{8}$ th inch. The test pieces shall be bent over the thinner section.

From Board of Trade and British Standard Specifications.

Bend tests may be made by pressure or by blows.

From Board of Trade Regulations and Bombay Revised Rules

34. If full allowance for steel castings is not required only bend tests as above need be taken.

No tests need be made from unimportant steel castings or from steel castings which are used for articles usually made of cast iron if the scantlings are materially reduced below what would be required if cast iron were used.

FORMS OF BRITISH STANDARD TENSILE TEST PIECES.

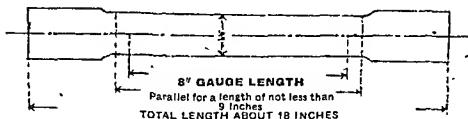
For plates and other structural material.

TEST PIECE A.

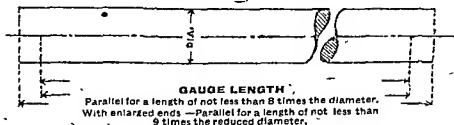
For thicknesses over $\frac{3}{8}$ " :—Maximum width allowed = $1\frac{1}{2}$ inches.

For thicknesses $\frac{3}{8}$ " to $\frac{1}{2}$ " :—Maximum width allowed = 2 inches.

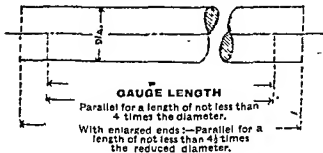
For thicknesses under $\frac{3}{8}$ " :—Maximum width allowed = $2\frac{1}{2}$ inches.



TEST PIECE B.



TEST PIECE F.



SECTION III.—RULES FOR DETERMINING THE WORKING PRESSURE TO BE ALLOWED ON VARIOUS PARTS OF BOILERS.

CYLINDRICAL SHELLS.

1. *Formula for Working Pressure of Shell.*—"For cylindrical shells, barrels, steam and water drums, and domes of boilers the maximum working pressure per square inch to be allowed shall be calculated from the following formula":—

Adapted from Board of Trade "Standard Condition" to suit various types of land boilers.

Equation 1.

$$W. P. = \frac{(t-2) \times S \times J.}{C \times D.}$$

W. P. is the working pressure in lbs. per square inch.

t is the thickness of shell plates in 32nds of an inch.

S. is the minimum tensile breaking strength of the shell plates in tons per square inch, "or whatever strength is allowed under Clause 2 of this section."

Last sub-paragraph added to provide for material not up to standard.

J. is the percentage of strength

Alternatives added to suit various types and conditions.

by the methods hereafter described;

C. is a co-efficient as follows:—

275 when the longitudinal seams are made with double butt straps "and when small shells are formed from solid rolled sections"

Added to provide for certain small shells.

283 when the longitudinal seams are made with lap joints and are treble riveted.

29 when the longitudinal seams are made with lap joints and are double riveted.

"30 when the longitudinal seams are welded and are fitted with a single butt strap."

Added to provide for the stated condition.

33 when the longitudinal seams are made with lap joints and are single riveted.

D. is the inside diameter of the outer strake of plating of the cylindrical shell measured in inches.

The Factor of Safety must be in no case less than 4.

"An addition of 10 per cent. shall be made to the appropriate co-efficient for shell plates of externally fired boilers exposed to the direct impact of furnace flame and for shell plates into which tubes are expanded."

New, from Bombay Revised Rules

The above co-efficients are standard and are to be used only for boilers open to inspection by an Inspector during the whole period of construction and which are certified by him as having

been constructed in accordance with the Standard Conditions laid down in these rules.

New, to provide for holders not up to standard but fit for work at a reduced percentage from Regular Revised Rates and premium

For shells with best type of joint and up to standard. The factor of safety is 4. If (a) and (b) doubtful and 25 tons instead of 28 tons to allow the maximum factor of safety will be 3.5 which is not too high for unknown conditions

2. *Factor shells not in accordance with Standard*

Conditions—When the standard conditions are not complied with, additions to the appropriate coefficient are to be made as follows—

- (a) 15 per cent. of the standard coefficient when there are no perfect tests of material. In any case if the Inspector is satisfied that the shell plates are of good material, Sir Equation I shall be taken at 24 tons for steel, 21 tons for iron with the grain and 18 tons for iron across the grain.
- (b) 10 per cent. of the standard coefficient when a holder has not been inspected during construction by an Inspector and certified by him.
- (c) 1 per cent. of the standard coefficient for each ten per cent. of a ton by which the minimum tensile breaking strength of steel shell plates is below the minimum provided in section II.

Steel having a tensile breaking strength below 24 tons should be treated as in (a).

- (d) 50 per cent. of the standard coefficient when the workmanship is in any way doubtful and the Inspector is not satisfied that one of the foregoing additions to the coefficient would be sufficient to meet the circumstances as the Chief Inspector directs.

3. *Minimum Thickness of Shell Plates*—Shell plates must not be less than
Two Regular Revised Rates and premium
thickness in thickness.

4. *Position of Longitudinal Seams*—Each piece of plate forming the shell of a steam boiler should be in one piece and have its longitudinal seam well fastened with those of the adjacent pieces in Lapland or Coriish and Water-tight Joints, whose parts of the shell are equal to form the longitudinal seams of shell to be in the strong seam and not alternately on each side of the seam and also of the thick work.

5. *Position of Radial Seams*—The joints of the seams of the shell plates to the end of the shell shall not be more than 42 per cent. of that of the shell plates. When the shell plates exceed 1 inch in thickness the seams connecting the shell plates to the end plates or a girth bar are to be double riveted.

6. *Other Circumstances of Seams*—The circumferential seams forming the rings of all 7 plates should have a strength of joint not less than 40 per cent. of the solid plate. When the shell plates exceed 1 inch in thickness the intermediate circumferential seams of Lapland or Coriish and Marine type Boilers are to be at least double riveted.

Actual Force Factor of Steel—“Steel and Cast Iron” Inspection of the joints of circumferential and radial seams of steel plates of 1/2 inch to 1/4 inch thickness shall be at least 100 per cent. of the circumferential seams of Lapland or Coriish Boilers and at least 125 per cent. of the

7. *Welded Shell Plates.*—"Welded seams in boiler shells must not be passed unless" the weld is covered by a butt strap or straps "securely riveted to the shell." For small steam domes where the welding is done by hammer and the plates do not exceed $\frac{1}{2}$ inch in thickness the straps may be omitted.

The strength shall in such cases be assumed to be 50 per cent. of that of the solid plate. "The thickness of the covering strap over the weld should be in accordance with the rules for butt straps."

8. *Butt Ends of Shell Rings.*—The ends of shell plate rings where butted should be given the same curvature in the rolls as the rest of the ring. The setting should not be done by hammering.

9. *"Butt Straps.*—Butt straps must be cut from plates and not from rolled strip." "They should be bent in the rolls to the required curve. Thinning of the ends of butt straps which tuck under the shell rings should be done by machine and not by heating and hammering."

10. *Methods of Calculating the Strength of Riveted Joints.*—The percentage of strength of a riveted joint (J) is found from the following formulæ (a), (b), (c) (a) and (b) are applicable to any ordinary type of joint, (c) is applicable only to that type of joint in which the number of rivets in the inner rows is double that of the outer row. The lowest value given by the application of these formulæ is to be taken as the percentage of strength of the joint compared with the solid plate.

Equation 2.

$$(a) \frac{100(P-D)}{P} = \text{Plate percentage.}$$

Equation 3.

$$(b) \frac{100 \times A \times N \times C \times S_1}{P \times T \times S} = \text{Rivet percentage}$$

Equation 4.

$$(c) \frac{100(P-2D)}{P} + \frac{100 \times A \times C \times S_1}{P \times T \times S} = \text{Combined Plate and rivet percentage.}$$

P is the pitch of rivets at outer row in inches,

D is the diameter of rivet holes in inches,

A is the sectional area of one rivet hole in square inches,

N is the number of rivets per pitch, (P).

T is the thickness of plate in inches,

C is a constant which = 1 for rivets in single shear as in lap joints, and 1.875 for rivets in double shear as in double butt strapped joints.

S_1 is the shearing strength of rivets, which is taken generally to be 23 tons per square inch for steel "and 18 tons per square inch for iron," and may, "in each case," be 85 per cent. of the minimum tensile breaking strength of the rivet bars

S is the minimum tensile breaking strength of shell plates in tons per square inch "or whatever strength is allowed under clause 2 of this section."

Last sub-paragraph added to provide for material not up to standard.

In the first formula (a) D is the diameter of the rivet holes in the outer rows and in the third formula D is the diameter of the rivet holes in the next rows. In the last formula A is the area of one rivet hole in the outer row.

When the sectional area of the rivet holes is not the same in all rows, and when some of the rivets are in double shear and others in single shear, the rivet sections per pitch of each size or shear should be computed separately and added together to form the total rivet section.

11. *When pitch exceeds maximum allowed.*—Should the pitch of the rivets exceed the maximum pitch allowed, the permissible pitch is to be used in place of the actual pitch in determining the percentage of plate section, "but in no circumstances shall a greater percentage than 85 be allowed for any type of joint."

Taken from Bombay Revised Rules and practice. Necessary to penalise bad design.

Percentage of strength of any joint limited to 85 is a new provision to prevent unduly high allowance for freak joints

12. *Butt straps and spacing of rivets below requirements.*—Should the spacing of the rows of rivets or the distance between edge of plate and rivet hole, or the thickness of butt straps be less

Taken from Bombay Revised Rules and practice. Necessary to penalise bad design.

13. *Percentage of welder*—In determining the percentage of a strap or straps per cent. should be added to the rivet percentage for the weld.

New—from practice.

14. *Percentage to be allowed for solid rolled shells*—When small shells are rolled from the solid, J in Equation I may be taken as 95 per cent.

From Bombay Revised Rules—slightly modified.

15. *Thickness of butt*—

From Bombay Revised Rules and Board of Trade "Standard Conditions."

Single butt straps having ordinary riveting—

Equation 5.

$$1.125 T = T_1.$$

Single Butt Straps having every alternate Rivet in the outer rows omitted.—

Equation 6.

$$1.125 T \times \frac{(P-D)}{(P-2D)} = T_1.$$

Double butt straps of equal width having ordinary riveting.—

Equation 7.

$$.625 T = T_1.$$

Double butt straps of equal width having every alternate rivet in the outer rows omitted.—

Equation 8.

$$.625 T \times \frac{(P-D)}{(P-2D)} = T_1.$$

Double butt straps of unequal width having ordinary riveting.—

Equation 9.

$$.75 T = T_1 \text{ (wide strap).}$$

Equation 10.

$$.625 T = T_1 \text{ (narrow strap)}$$

Double butt straps of unequal width having every alternate rivet in the outer rows omitted.—

Equation 11.

$$.75 T \times \frac{(P-D)}{(P-2D)} = T_1 \text{ (wide strap).}$$

Equation 12

$$.625 T \times \frac{(P-D)}{(P-2D)} = T_1 \text{ (narrow strap).}$$

T_1 is the thickness of the butt straps in inches. The other symbols have the same significance as in clause 10 of this section.

"Single and wide butt straps must always be on the inside of the shell."

New—from practice.

"Single and wide butt straps must always be on the inside of the shell."
New—not up

16. *Maximum pitch of rivets in longitudinal joints.*—The maximum pitch of the rivets in the longitudinal joints of boiler shells is to be —
From Board of Trade "Standard Conditions" be —
with a column for single butt strapped joints added

Equation 13

$C \times T + 1.625$ maximum pitch in inches.

T is the thickness of the shell plate in inches,

C is a co-efficient as given in the following table —

Number of Rivets per Pitch.	Co-efficients for Lap Joints	Co-efficients for single Butt-strapped joints	Co-efficients for double Butt-strapped joints.
1	1.31	1.53	1.75
2	2.62	3.06	3.50
3	3.47	4.03	4.63
4	4.14		5.32
5	"	"	6.00

Distances between rows of rivets and between rivets and plate edges.—In all cases the clear space between a rivet hole and the edge of a plate should not be less than the diameter of the rivet holes, i.e., the centre of the rivet hole should be at least $1\frac{1}{2}$ " diameters distant from the edge of the plate.

In joints, whether lapped or fitted with butt straps, in which there are more than one row of rivets and in which there is an equal number of rivets in each row, the distance between the rows of rivets should be not less than—

From Board of Trade
"Standard Conditions."

Zig-zag Riveting.

Equation 14

$$\cdot 33 P + \cdot 67 D = \text{distance between rows,}$$

Chain Riveting.

Equation 15.

$$2 D = \text{distance between rows.}$$

In joints in which the number of rivets in the outer rows is one half of the number in each of the inner rows, and in which the inner rows are chain riveted, the distance between the outer rows and the next rows should be not less than—

Equation 16.

$$\cdot 33 P + \cdot 67 D \text{ or } 2 D = \text{distance between rows,}$$

whichever is the greater, and the distance between the rows in which there are the full number of rivets should be not less than $2 D$.

In joints in which the number of rivets in the outer rows is one half of the number in each of the inner rows, and in which the inner rows are zig-zag, the distance between the outer rows and the next rows should be not less than—

Equation 17.

$$\cdot 2 P + 1 \cdot 16 D = \text{distance between outer and next rows.}$$

The distance between the rows in which there are the full number of rivets should be not less than—

Equation 18.

$$\cdot 165 P + \cdot 67 D = \text{distance between inner rows.}$$

P is the pitch of the rivets in the outer rows,

" D is the diameter of the rivet holes in inches or the mean diameters of rivet holes when the distance to be determined is between two rows of rivets of different diameters."

Should the distance between rows of rivets be less than as prescribed above, the plate percentage determined by Equation 2 should be modified thus—

New—Provision for spacing not up to the Standard.

Equation 19.

$$\frac{100 \left[P - \left(2 - \frac{\text{actual distance}}{\text{prescribed distance}} \right) D \right]}{P} = \text{distance of rows percentage,}$$

HEMISPHERICAL AND DISHED END PLATES.

18. *Complete Hemisphere without stays or other support made of more than one plate and subject to internal pressure.*

Taken from Board of Trade "Standard Conditions"

Equation 20.

$$W. P. = \frac{(t-2) \times S \times J}{C \times R}$$

W. P. is the working pressure in lbs. per square inch,

t is the thickness of the end plates in 32nds of an inch,

S is the minimum tensile breaking strength of the end plates in tons per square inch, "or whatever strength is allowed for them,"

J is the strength of riveted joint per cent. of solid plate,

R is the inner radius of curvature in inches,

C for single riveting is 3.3,

C for double riveting is 2.9,

C for treble riveting is 2.83.

19. *Dished or hemispherical ends formed in one piece and subject to internal pressure*—For ends of steam and water drums, tops of

Taken from Board of Trade "Standard Conditions."—Description enlarged.

vertical boilers, etc., when either dished to partial spherical form or when hemispherical in form, and without stays, the following formula is to be used—

Equation 21.

$$W. P. = \frac{15 \times S (t-1)}{R}$$

W. P. is the working pressure in lbs. per square inch,

t is the thickness of end plates in 32nds of an inch,

R is the inner radius of curvature of the end in inches, which shall not exceed the diameter of the shell to which it is attached,

S is the minimum tensile breaking strength of plate in tons per square inch, "or whatever is allowed for it."

When the end has a manhole in it, 1/2nds must be added to the thickness of the plate. The inside radius of curvature at the flange must not be less than 4 times the thickness of the end plate, and in no case less than 2 1/2 inches.

The total depth of flange of manhole from the outer surface in inches is to be at least equal to.

Equation 22.

$$\sqrt{T \times W}$$

where T is the thickness of the plate in inches, and W. is the minor axis in inches.

20. *Similar ends to the above but subject to external pressure.*—For similar ends subject to external pressure (in compression) the co-efficient 15 in Equation 21 should be substituted by 12, and R should be the outer radius of curvature of plate. For plates exposed to furnace flame the co-efficient should be 10.5.

New—adapted from Board of Trade "Standard Conditions" Allows about 4750 lbs stress per inch of section when S=23 tons.

21. *Dished ends of Lancashire and Cornish type boilers.*—For dished ends of Lancashire and Cornish boilers with external or internal flanges for furnaces formed in one piece, without stays and subject to internal pressure, the following formula is to be used:—

Adapted from Board of Trade "Standard Conditions" formula.

Allows about 9,000 lbs. stress per inch of section when $S=26$ tons, which agrees with good practice.

Equation 23

$$W.P. = \frac{22 \times S (t-1)}{R}$$

W. P. is the working pressure in lbs per square inch,

t is the thickness of the end plate in 32nds of an inch,

R is the inner radius of curvature of the end in inches which shall not exceed one and a half times the internal diameter of the shell to which it is attached,

S is the minimum tensile breaking strength of the plate in tons per square inch "or whatever is allowed for it"

The inside radius of curvature at the flange must not be less than 4 times the thickness of the plate and in no case less than $3\frac{1}{2}$ inches. When the end plate has a manhole in it the total depth of the flange from the outer surface in inches is to be at least equal to—

Equation 24.

$$\sqrt{T \times W}$$

where T is the thickness of the plate in inches and W is the minor axis in inches.

Dished plates should be pressed to shape and flanged at one operation and efficiently annealed afterwards.

22. *Dished ends with Upstays.* N. the influence of

From Bombay Revised Rules,

determining the red crown plates res, when consi- pressure should be

allowed.

The radius R of the dished part may be found as follows:—

Equation 25.

$$R = \frac{C^2 + H^2}{2H}$$

C and H are the lengths in inches of half the base line or chord on which H is measured and the height of the dish or camber at the middle of the chord respectively.

FLAT PLATES.

23. *Flat plates supported by screwed stays.*—The working pressure to be From Board of Trade allowed on flat plates supported by stays is to be calculated by the following formula:—

Equation 26.

$$W.P. = \frac{(t-1) \times C}{A^2 + B^2}$$

in this formula and in those following in this sub-section.

$W.P.$ is the working pressure in lbs. per square inch,

t is the thickness of the flat plate in 32nds of an inch,

t_1 is the thickness of the washers, strips, or doublings employed, in 32nds of an inch,

A is the distance apart of the rows of stays, in inches,

B is the pitch of the stays, in the rows, in inches,

C is a co-efficient which varies with the method of fixing the stays as follows —

Where the plates are exposed to flame and the stays are screwed into the plate and their ends are riveted over, $C=50$.

Where the plates are not exposed to flame and the stays are screwed into the plate and their ends are riveted over, $C=57$.

In these cases the thickness of the plate must be at least half the diameter of the stay required by the rule

Where stay tubes are screwed into tube plates and expanded, $C=52$. If they are fitted with nuts, $C=72$.

Where the plates are exposed to flame and the stays are screwed into the plate and fitted with nuts on the outside, $C=75$, where the plates are not exposed to flame, $C=86$.

Where the stays pass through plates not exposed to flame and are fitted with nuts inside and outside, $C=96$.

Where plates are stiffened by stays, which is not greater than 110 where exposed to flame. The

For portions of plate where the stays are irregularly pitched D^2 is to be used instead of $A^2 + B^2$, D being the diameter of the largest circle which can be drawn passing through not less than three points of support viz., the centres of stays, or rivets, or the commencement of the curvature of flanging, whichever is applicable. In this case C is to be taken as the mean of the values appropriate for the points of support.

For the tops and sides of combustion chambers and fire boxes the distance between the rows of stays nearest to the back tube plate, or the back or firehole plate respectively, and the commencement of curvature of these plates at their flanges, shall not be greater than A .

For the tops of combustion chambers and fireboxes where they are joined to the

Where portions of plates are supported by stays secured in different ways, the value of C to be taken is the mean of the values appropriate to the method of securing the supporting stays.

24. Flat plates supported by stays and nuts and large washers or strips or doublings—Where the plates are supported by stays

From Board of Trade "Standard Conditions" passing through them and are fitted with nuts inside and washers and nuts outside, the diameter of the washers being at least $3\frac{1}{2}$ times that of the stay, and their thickness at least two thirds that of the plate, but not greater than that of the plate, the working pressure shall be:—

Equation 27.

$$W.P. = \frac{100}{A^2 + B^2} [(t-1)^2 + .15 t_1^2].$$

21. *Dished ends of Lancashire and Cornish type boilers.*—For dished ends of

Adapted from Board of Trade "Standard Conditions" formula.

Allows about 9,000 lbs. stress per inch of section when $S=26$ tons, which agrees with good practice.

Lancashire and Cornish boilers with external or internal flanges for furnaces formed in one piece, without stays and subject to internal pressure, the following formula is to be used :—

Equation 23.

$$W. P. = \frac{22 \times S (t-1)}{R}$$

W. P. is the working pressure in lbs. per square inch,

t is the thickness of the end plate in 32nds of an inch,

R is the inner radius of curvature of the end in inches which shall not exceed one and a half times the internal diameter of the shell to which it is attached,

S is the minimum tensile breaking strength of the plate in tons per square inch "or whatever is allowed for it."

The inside radius of curvature at the flange must not be less than 4 times the thickness of the plate and in no case less than $3\frac{1}{2}$ inches. When the end plate has a manhole in it the total depth of the flange from the outer surface in inches is to be at least equal to—

Equation 24.

$$\sqrt{T \times W}$$

where T is the thickness of the plate in inches and W is the minor axis in inches.

Dished plates should be pressed to shape and flanged at one operation and efficiently annealed afterwards.

22. *Dished ends with Uptakes.*—No account should be taken of the influence of the uptake tube in vertical boilers when determining the pressure by the above rules. If dished crown plates having uptakes are fit for higher pressures, when considered as flat plates, such higher pressure should be allowed.

From Bombay Revised Rules.

The radius R of the dished part may be found as follows :—

Equation 25.

$$R = \frac{C^2 + H^2}{2H}$$

C and H are the lengths in inches of half the base line or chord on which H is measured and the height of the dish or camber at the middle of the chord respectively.

FLAT PLATES.

23. *Flat plates supported by screwed stays.*—The working pressure to be allowed on flat plates supported by stays is to be calculated by the following formula :—

From Board of Trade "Standard conditions."

Equation 26.

$$W. P. = \frac{(t-1)^2 \times C}{A^2 + B^2}$$

* New—adapted from Board of Trade "Standard Conditions." Co-efficient determined by comparison with Bombay Rules and the National Boiler Insurance Company's Rules and from practice.

26. *Plates supported by gusset stays*—For the end plates of Lancashire, Cornish, Vertical and Locomotive boilers, and other flat surfaces supported by irregular pitched gusset stays the working pressure is to be determined as follows:—

Equation 31.

$$W. P. = \frac{C(t-1)^2}{D^3}$$

D is the diameter of the largest circle which can be drawn passing through not less than three points of support viz, the centre lines of rivets or the commencement of the curvature of flanging, whichever is applicable

C=100 for plates not exposed to flame;

C=88 for plates exposed to flame.

Where such plates are stiffened by suitable tee or angle bars securely riveted to the plates within the circle D, the appropriate co-efficient may be increased thirty per cent. Such stiffening bars should be placed so as to transmit their load in a direct manner to the gusset stays or shell plate

New—adapted from Board of Trade "Standard Conditions" and Bombay Revised Rules and practice.

For the part of the end plate containing the manhole in Lancashire boilers the following formula is to be used —

Equation 34

$$W. P. = \frac{C[(t-1)^2 + (t_1-1)^2]}{D^3}$$

where D is the diameter of the largest circle which can be drawn enclosing the manhole and passing through the centres of the rivets in end plates connecting the shell and gusset angles and furnaces, or to the commencement of curvature of flanging whichever is applicable;

t is the thickness of the end plate in 32nds of an inch;

t₁ is the thickness of the base of the mouthpiece or flat ring in 32nds of an inch;

C=90 when the manhole mouthpiece is either of mild or cast steel, and has a turned in flange of a depth, measured from inside of end plate, of not less than 4 times the thickness of the end plate, and a thickness not less than the thickness of the end plate

C=70 when only a flat steel compensating ring is fitted.

27. *Flanged manholes and mudholes in flat plates*—When a flat plate is

flanged to stiffen it at a manhole or sight hole, to permit the same working pressure as would be allowed upon an unpierced plate, the depth of the flange measured from the outer surface is to be at least equal to—

Equation 35.

$$\sqrt{T \times W}$$

where T is the thickness of the plate in inches, and W is the minor axis of the hole in inches.

Where the washers have a diameter of at least two thirds of the pitch of the stays and a thickness of at least two thirds of the thickness of the plate, but not greater than that of the plate, and are riveted to the plate, in an efficient manner the working pressure shall be :—

Equation 28.

$$W.P. = \frac{100}{A^2 + B^2} [(t-1)^2 + .35 t_1^2].$$

the pitch of the stays of the plate, but not efficient manner, the

Equation 29.

$$W.P. = \frac{100}{A^2 + B^2} [(t-1)^2 + .55 t_1^2].$$

Where the plates are fitted with doubling plates having a thickness of at least two thirds of that of the plate, but not greater than that of the plate, and are riveted to them in an efficient manner the working pressure shall be :—

Equation 30.

$$W.P. = \frac{100}{A^2 + B^2} [(t-1)^2 + .85 t_1^2].$$

25. *Back and front tube plates.*—No nuts are to be fitted to stay tubes at the combustion chamber or fire-box end

For the portions of tube plates in the nests of tubes,—

Equation 31.

$$W.P. = \frac{C(t-1)^2}{P^2}$$

P is the mean pitch of the stay tubes supporting any portion of the plate (being the sum of the four sides of the quadrilateral divided by four);

C=38 when the stay tubes are screwed and expanded into the plate and no nuts are fitted

C=49 when the stay tubes are screwed and expanded into the plate and fitted with nuts.

For the wide water spaces of front tube plates between the nests of tubes, and between the wing rows of tubes and the shell,—

Equation 32.

$$W.P. = \frac{C[(t-1)^2 + .55 t_1^2]}{A^2 + B^2}$$

A is the horizontal pitch of stay tubes in inches measured across the wide water space from centre to centre;

B is the vertical pitch of stay tubes in the bounding rows in inches measured from centre to centre;

C=52 when the stay tubes are screwed and expanded into the tube plates and no nuts are fitted;

C=72 when the stay tubes are screwed and expanded into the tube plates and nuts are fitted to each stay tube;

C=63 when the stay tubes are screwed and expanded into the tube plates and nuts are fitted only to alternate stay tubes.—

* New—adapted from Board of Trade "Standard Conditions." Co-efficient determined by comparison with Bombay Rules and the National Boiler Insurance Company's Rules and from practice.

26. *Plates supported by gusset stays*—For the end plates of Lancashire, Cornish, Vertical and Locomotive boilers, and other flat surfaces supported by irregular pitched gusset stays the working pressure is to be determined as follows—

Equation 31.

$$W. P. = \frac{C(t-1)^2}{D^2}$$

D is the diameter of the largest circle which can be drawn passing through not less than three points of support *viz.*, the centre lines of rivets or the commencement of the curvature of flanging, whichever is applicable.

C=100 for plates not exposed to flame;

C=88 for plates exposed to flame.

Where such plates are stiffened by suitable tee or angle bars securely riveted to the plates within the circle D, the appropriate co-efficient may be increased thirty per cent. Such stiffening bars should be placed so as to transmit their load in a direct manner to the gusset stays or shell plate.

New—adapted from Board of Trade "Standard Conditions" and Bombay Revised Rules and practice.

For the part of the end plate containing the manhole in Lancashire boilers the following formula is to be used—

Equation 32.

$$W. P. = \frac{C[(t-1)^2 + (t_1-1)^2]}{D^2}$$

where D is the diameter of the largest circle which can be drawn enclosing the manhole and passing through the centres of the rivets in end plates connecting the shell and gusset angles and furnaces, or to the commencement of curvature of flanging whichever is applicable;

t is the thickness of the end plate in 32nds of an inch;

t₁ is the thickness of the base of the mouthpiece or flat ring in 32nds of an inch;

C=90 when the manhole mouthpiece is fitted with a steel flange.

C=70 when only a flat steel compensating ring is fitted.

27. *Flanged manholes and mudholes in flat plates*—When a flat plate is

flanged to stiffen it at a manhole or sight hole, to permit the same working pressure as would be allowed upon an unpierced plate, the depth of the flange measured from the outer surface is to be at least equal to—

Equation 33.

$$\sqrt{T \times W}$$

where T is the thickness of the plate in inches, and W is the minor axis of the hole in inches.

28. *Flat crown plates of vertical boilers.*—For the flat crown plates or vertical boilers either with or without bolt stays, use equation

New—adapted from Board of Trade "Standard Conditions" and National Boiler Insurance Company's Rules.

33 in determining the working pressure with $C=80$ when the plates are not exposed to flame and 70 when they are exposed to flame. In this case the circle D is the largest that can be drawn passing through the centres of the

the washers rivets, but where the washers are not riveted or where none are fitted the circle should pass through the centres of the stays.

29. *Circular flat ends.*—For circular flat ends supported only at edges, C is to

Adapted from Board of Trade "Standard Conditions" and practice

be taken as 120 when the plates are not exposed to flame and 105 when they are exposed to flame. In this case the circle D should pass through the centre line of rivets or bolts securing the end to the shell or, when the end is flanged, through the commencement of curvature.

30 *Bar or bulb stiffened end plates and smokebox tube plates of locomotive*

Adapted from Board of Trade "Standard Conditions" and practice

boilers.—Where such plates instead of being supported by stays are stiffened in the steam space by substantial tee or angle bars securely riveted to the plate and extending across the plate to within the margin allowed

by the following rule, or where such plates are formed with a deep bulb extending across the plate to within the margin allowed, for the support thus given

C may be taken as = $\frac{60 + 120}{2}$ respectively.
measured from
of bulb provided
bulb

For the flat plate above the stiffener or bulb, C is to be taken as the mean of the values appropriate for the points of support

31. *Flat plate margins.*—The amount of support in relief of stays which

Adapted from Board of Trade "Standard Conditions" and practice.

may be credited to the sides of shells, furnaces, uptakes, firehole and foundation rings, etc., to which flat plates are attached should not exceed that found by the following formula—

Equation 36

$$\frac{1}{2} \times \sqrt{\frac{C(t-1)^2}{W.P.}}$$

W. P. is the intended working pressure in lbs. per square inch.

$C=90$ where the plates are not exposed to flame,

$C=80$ where the plates are exposed to flame.

Where the plates are flanged the margin should be measured from the side of the flange next the inner radius of corner. In other cases the margin is to be measured from the centres of riveted seams.

STAYS.

32. *Iron or steel screw stays to combustion chambers and fireboxes.*—For

From Board of Trade "Standard Conditions."

screw stays with threads not coarser than 9 threads per inch, made of steel or of special wrought iron tested to the requirements of section II, the following formula

is to be used:—

Equation 37.

$$W.P. = \frac{(D - 267)^2 \times 8250}{A}$$

D is the diameter of the stay over the thread in inches.

A is the area in square inches supported by one stay.

But in no case must the stress exceed 9,000 lbs. per square inch of section.

33. *Copper stays to fireboxes*—For copper screw stays a stress of 5,500 lbs. per square inch of net section may be allowed.

From the National Boiler Insurance Company's Rules and from practice

34 *Steel longitudinal stays*.—For steel longitudinal stays with threads not coarser than 6 threads per inch, the working pressure is to be calculated from the following formula.—
From Board of Trade
"Standard Conditions"

Equation 39.

$$W P = \frac{(D - .34)^2 \times 9500}{A} \times \frac{S}{23}$$

D is the diameter of the stay over the thread in inches.

A is the area in square inches supported by one stay.

S is the minimum tensile breaking strength of the steel in tons per square inch

But in no case must the stress exceed 11,000 lbs. per square inch of section when steel of a minimum tensile breaking strength of 23 tons per square inch is used.

the
coar
from the following formula.—

Equation 39.

$$W. P. = \frac{(D_1 - .125)^2 \times 9500}{A} \times \frac{S}{23}$$

D₁ is the diameter of the stay at the bottom of the thread or at the smallest part of the body

35. *Stress on stay tubes*—On stay tubes whether of wrought iron or of lap-welded steel, a working stress of 7,500 lbs per square inch of the net sectional area at the bottom of the thread is permitted
From Board of Trade
"Standard Conditions"

36. *Standard threads of screw and other stays*.—All longitudinal stays and screw stays should have threads in accordance with the British standard specification, true to pitch, viz. :—
From Board of Trade
"Standard Conditions"

All screw stays 1½ inch in diameter and upwards should have 9 threads per inch, and all stays 2 inches in diameter and above passing through plates and secured by nuts on each side of the plate should have not more than 6 threads per inch

It is desirable that the threads of all screw stays should be turned off between the parts fitting into the plates

It is desirable also that the outer ends of screw stays should have a hole 3/16 inch diameter drilled axially to a distance ½ inch beyond the inner face of the outside plates.

37. *Stays not to be welded Annealing of fireworked stay bars*.—No steel stays are to be welded If plain threads are desired, the ends of the stay bars may be upset or the bars may be drawn down in the central portions from bars originally of the size of the ends In either of these two cases the bars must be subsequently annealed throughout.
From Board of Trade
"Standard Conditions"

In boilers over 12 feet in length between end plates the through longitudinal stays must be supported at or near the middle of their length.

38. *Longitudinal stays between tube plates.*—Where jointed longitudinal stays are fitted between the front and back tube plates or elsewhere, it is desirable that they should be fitted

From Board of Trade
"Standard Conditions."
in excess of that of the stay.
being not more than $1/16$ in
of the eye forging. The
all round, i.e., the diameter
of the hole plus 1 inch.

39. *Stay tubes.*—Stay tubes are to be screwed at both ends with continuous threads, and the holes in the tube plates are to be tapped with continuous threads. The stay tubes are to be expanded by roller expanders and not made tight by caulking only.

40. *Minimum thickness of stay tubes.*—The minimum thickness of stay tubes measured under the threads shall be $\frac{1}{8}$ inch for marginal stay tubes and $\frac{1}{16}$ inch for other stay tubes.

For small boilers the minimum thickness of stay tubes, whether marginal or otherwise, shall be $\frac{1}{8}$ inches.

41. *Thickened ends.*—If the ends of the stay tubes are thickened, they must be annealed after the upsetting.

42. *Stays in compression.*—The same stress shall be allowed in compression as in tension and shall be calculated on the net section of the stay except where otherwise laid down.

43. *Nuts to screw stays.*—Nuts to screw stays in combustion chambers and fire boxes shall not be less and need not be more than $\frac{3}{4}$ inch thick for stays up to $1\frac{1}{2}$ inches diameter over threads, $\frac{5}{8}$ inch thick for $1\frac{1}{2}$ and $1\frac{3}{4}$ inch stays, 1 inch thick for $1\frac{3}{4}$ and 2-inch stays, and $1\frac{1}{4}$ inch thick for stays over 2-inch in diameter.

The nuts for longitudinal stays shall be according to the British Standards appropriate to the diameters of the stays, the outside nut having the thickness therein prescribed for ordinary nuts, and the inside nuts having the thickness provided for lock nuts.

The nuts shall be made of solid mild steel or of iron which must be without weld when exposed to flame.

44. *Areas in upper spaces of flat end plates of locomotive type and vertical boilers supported by stays.*—When the areas supported by stays are semi-circular as in the upper parts of end plates and smoke box tube plates of locomotive boilers, or annular as in the crown plates of vertical type boilers, the area to be supported by stays, should, in the first case, be or barrel sides, the second case shell. When aggregate stay

45. *Diagonal bar or rod stays.*—The sectional area of a diagonal rod or bar stay should bear the same proportion to that of a direct stay as the length of the diagonal stay bears to the length of the direct stay. The ends of the stays should be with bevelled pins (see

The section of least strength whether of stay, rivets, shackle or pin should be used in determining the working pressure.

46. *Gusset stays of Lancashire and Cornish boilers.*—Gusset stays should be attached to end and shell plates by double angles, not less in thickness than the gusset plates with properly spaced and formed rivets.

The working pressure for the stay when of ordinary form is to be calculated by the following formula:—

Equation 40.

$$W.P. = \frac{8500 \times C}{A}$$

C the co-efficient, is the number representing the least of the following:—

- (1) $N_1 \times A_1$
- (2) $N_2 \times A_2 \times 1.75$
- (3) $N_3 \times A_3 \times 1.75$
- (4) $N_4 \times A_4$
- (5) $(G - N^2 \times D^2) \times (t - 2) \times 0.37$
- (6) $(G - D_1) \times (t - 2) \times 0.37$

$N_1, N_2, N_3, N_4, D_1, D_2, D_3, D_4$ and A_1, A_2, A_3, A_4 are respectively the numbers, diameters and sectional areas of the rivets in the joints of each gusset stay, the order of the joints being (1), angle to end plate, (2), end plate angles to gusset, (3) shell angles to gusset, and (4), angles to shell

G in the depth in inches of gusset plate measured through the line of rivets attaching it to the end plate angles.

G_1 is the depth in inches of gusset plate measured normal to the slant edge of plate through the rivet nearest to the end plate in the joint attaching gusset plate to shell angles.

A is the area in inches of flat plate supported by the gusset stay which, in the case of Lancashire and Cornish boilers, should be determined as follows:—

The margins allowed under the end plates and the lengths of also the distance between each a direction normal to the greater. If L and L_1 be the lengths of two adjacent gusset lines and if the distance between them be W , the area contained by the gusset lines and the shell and furnace margin lines may be apportioned between the stays thus:—

Equation 41.

$$\frac{W(3L + L_1)}{8} = \text{Portion of area in square inches apportioned to } L \text{ line gusset.}$$

Equation 42.

$$\frac{W(3L_1 + L)}{8} = \text{Portion of area in square inches apportioned to } L_1 \text{ line gusset.}$$

The second formula is from the Bombay Rules and is intended for girders of any section. The pressure allowed by it is precisely the same as by the first

t is the thickness of the girder at centre when a forging or casting, or the sum of the thicknesses of the plates where the girder is made of two plates, measured in 32nds of an inch.

D is the depth of the girder at middle in inches.

L is the length of the girder in inches, measured between the tube plate and fire hole or back plate, or between tube plates in chambers common to two opposite furnaces,

P is the pitch of the stays supported by the girder, in inches,

D_1 is the distance apart of the girders, centre to centre, in inches,

S is the minimum tensile breaking strength of the plates forming the girder in tons per square inch.

In the case of forged girders S is to be taken as 21 for iron and 23 for steel. For cast steel girders S is to be taken as 26 when no tests are produced,

I is the moment of inertia of section round neutral axis, expressed in inches,

Y is the distance in inches of the farther edge of section from neutral axis,

$C = \frac{N}{N+1} \times 21$, when the number of stays in each girder is odd, and $\frac{N+1}{N+2} \times 21$, when the number of stays in each girder is even, N being the number of stays to each girder.

$C_1 = 4030$ when the number of stays in each girder is odd, and $\frac{N+1}{N+2} \times 4030$ when the number of stays in each girder is even, N being the number of stays to each girder.

Where girders rest on end or side plates of fire-boxes, etc., they should be directly fitted and bedded to the edges and corners of the supporting plates.

Where girders are supported in any other way than by the end or side plates of the fire-box or combustion chamber, the calculations for determining the working pressure should be made in accordance with the changed conditions of support.

In such cases the length of the fire-box or combustion chamber top plate limit imposed on the distance of the number of bolts carried by stress of 14,000 lbs. per square inch

Slung girders should be sufficient of slung girders should be sufficient otherwise be carried by the girder,

In the case of slung girders by angle bars riveted to the casing under extends over the full breadth the centres of the angle faces. When this distance does not exceed that of L in the formula the pressure is to be determined in the ordinary way.

The supporting angle and rivets must be of sufficient section for the intended purpose

50. Spacing of Ends Stays. Allowance for curves, etc. — For the tops of fire-boxes and combustion chambers

For Star

curva rule.

Where the top is joined to the sides, the extension is of the extension is greater than half the allowable distance between the girders, the width of the flat portion measured from the centre of the girder should not be more than half the allowable distance between the girders. The working pressure for the supporting bolts and for the plate between them should be determined in the ordinary way.

From Board of Trade "Standard Conditions" with co-efficient derived from test and calculations of German Professors controlling the German Boiler Regulations and from Bombay practice.

51. *Cambered Fire Box Tops.*—For Marshall Sons and Company's Patent Cambered Fire Box Tops the working pressure should be determined by the following formula —

Equation 46.

$$W. P. = \frac{50 (t-1)^2}{D^2}$$

t is the thickness of the cambered plate in 32nds of an inch,

D is the diameter of the largest circle that can be drawn passing through the centre lines of ribs and rivets or commencement of curvature at sides.

52. *Corrugated Fire Box Tops.*—For Garretts Patent Corrugated Fire Box Roof plates the working pressure should be determined by the following formula; the least pressure obtained by either formula to be taken —

Equation 47.

$$W. P. = \frac{C (t-1)^2}{(L+2R) \times R} \dots \dots \dots$$

Equation 48.

$$W. P. = \frac{C_1}{R} \times [10 (t-1-L)] \dots \dots \dots$$

These formulae are from Board of Trade "Standard Conditions" with co-efficients determined from practice.

t is the thickness of the corrugated plate in 32nds of an inch,

L is the length of the roof plate between centre lines of rivets in inches,

R is the external radius of the side corrugations at the middle of the length in inches,

$C = 363$ where the roof and side plates are in one piece and 325 where they are riveted.

$C_1 = 125$ where the roof and side plates are in one piece and 1125 where they are riveted.

TUBE PLATES.

53. *Parts to be stayed.*—All flat tube plates, except those of loco-type boilers and of vertical boilers not exceeding 3 feet in diameter with vertical smoke tubes, must be stayed within the nests of tubes.

The parts of tube plates which lie outside the nests of tubes must be stayed or supported wherever the size of the area of plate subject to steam pressure necessitates staying or support.

D is the diameter of the tube holes in inches,

S is the minimum tensile breaking strength of the tube plates in tons per square inch,

R is the radial distance of the centre of the outer row of tube holes from the axis of the shell in inches.

57. Compression on Tube Plates.—The working pressure to be allowed for fire box or combustion chamber tube plates, which are subject to compression due to the pressure on the roof plate is to be determined by the following formula.

Adapted from Board of Trade "Standard Conditions" and Bombay Rules and practice.

Equation 55.

$$W. P. = \frac{C \times (P - D) \times t}{L \times P}$$

t is the thickness of the tube plate in 32nds of an inch,

P is the pitch of the tubes in inches, measured horizontally where the tubes are chain pitched, and diagonally where the tubes are zigzag pitched and the diagonal pitch is less than the horizontal,

D is the internal diameter of the plain tubes in inches,

L is the internal length of the fire-box or combustion chamber in inches measured at top between tube plate and firehole plate or back plate, or between tube plates in double ended boilers with combustion chambers common to two opposite furnaces,

C = 875 for steel and 344 for copper.

The above formula is not applicable in the case of fireboxes where the girders do not rest on the tube plate, or where the roof plate is stayed direct to the outer shell or to girders supported by the shell.

FURNACES.

58. Plain Furnaces of

From Board of Trade "Standard Conditions," wording altered to include parts of land boilers

sides are securely stayed, is to be determined by the following formulae, whichever is less.

Equation 56.

$$W. P. = \frac{C}{D} \times \frac{(t-1)^2}{L+21}$$

Equation 57.

$$W. P. = \frac{C_1}{D} \times [10(t-1) - L]$$

D is the external diameter of the furnace or chamber top or bottom in inches,

t is the thickness of the furnace plate in 32nds of an inch,

L is the length of the furnace or other part in inches measured between points of substantial support, i.e. centres of rows of rivets in end seams or commencement of curvature of flange, whichever is applicable,

C = 1450 where the longitudinal seams are welded and 1300 where they are riveted,

*C*₁ = 60 where the longitudinal seams are welded and 45 where they are riveted

59. Corrugated Furnaces of Horizontal Boilers.—The working pressure to be allowed for corrugated furnaces is to be determined by the following formula.

From Board of Trade "Standard Conditions."

Equation 58.

$$W. P. = \frac{C(t-1)}{D}$$

D is the external diameter in inches measured at the bottom of the corrugations,

t is the thickness of the furnace plate in 32nds of an inch measured at the bottom of the corrugation or camber,

C=480 for the Fox, Morrison, Deighton, Purves and other similar furnaces, and 510 for the Leeds Forge Bulb Suspension Furnace.

60. *Plain Furnaces of Vertical Boilers.*—The same formulae as for the plain furnace of horizontal boiler apply to these.

61 *Hemispherical Furnaces of Vertical Boilers*—When furnaces are hemispherical in form and subject to pressure on the convex side From Board of Trade and are without support from stays of any kind. "Standard Conditions"

Equation 59.

$$W. P. = 275 \frac{(t-1)}{R}$$

t is the thickness of the top plate in 32nds of an inch

R is the outer radius of curvature of the furnace in inches.

For the ogree ring which connects the bottom of the furnace to the shell and sustains the whole load on the furnace vertically.—

Equation 60.

$$W. P. = \frac{140(t-1)^2}{D(D-D_1)}$$

t is the thickness of the ogree ring in 32nds of an inch,

D is the inside diameter of the boiler shell in inches,

D₁ is the outside diameter of the lower part of the furnace where it joins the ogree ring

No furnace whether plain or corrugated should exceed 26 32nds inch in thickness, and all circular sectioned furnaces when new should be as near the truly circular form as the type of joint will permit.
From the Board of Trade
"Standard Conditions."
From practice

For new furnaces with welded or butted joints a difference of not more than 1/8th inch in the cross gaugings of any one section shall be allowed. Rivet holes are to be drilled as in the case of shells.

Where cross tubes are fitted they shall be riveted and not welded to the furnace tube. The longitudinal seams of cross tubes may be welded; the weld is not to be exposed to the direct impact of flame. No allowance is to be made for cross tubes in calculating the strength of the furnaces in which they are fitted.

From Bombay Revised Rules and practice.

62. Uptakes of Vertical Boilers—The working pressure for uptake tubes of vertical boilers is to be determined by the formula for plain furnaces, but only half the least pressure so found is to be allowed for uptake tubes.

From Bombay Revised Rules and practice.

When crown plates of vertical boilers are not fitted with smoke tubes, the uptake tubes in their capacity as stays should be strong enough to satisfy the following rule—

Equation 61.

$$W. P. = \frac{A \times S}{A_1}$$

A is the area of net section of tube or of rivets or bolts connecting uptake to furnace or shell crown plates in square inches, whichever is least

A₁ is the area in square inches of the annular surface around the uptake tube which, when no bolt or other stays are fitted, may be taken as extending to midway between inside of shell and waterside of uptake, but in no case beyond what would be allowed under flat plate rules for margins and measured accordingly.

Where bolt stays are fitted, the surface to be supported by the uptake may be taken as that within the inner circle of the annulus supported by the stays.

S is the stress allowed per square inch of net section of material which, for the tube itself, may be 4,000 lbs and for rivets 7,000 lbs in either shear or tension.

These requirements apply equally either to flat or dished crown plates.

MANHOLES, DOORS AND STAND BLOCKS.

63. Means for Examination and Cleaning.—All boilers should have, where possible, means for ingress whereby examination and cleaning of the inner surface of plates and tubes may be effected.

From Board of Trade

64. Manholes and sight-holes in Vertical Boilers—Where large cross tubes are fitted there must be a sight-hole in the shell opposite at least one end of each tube sufficiently large to examine and clean it. The doors of these sight-holes must be in positions accessible for that purpose. In addition to the cross tube sight-holes there must be at least three mud-holes round the base of the boiler.

From Board of Trade "Standard Conditions."

From practice

65. Manholes, Mudholes and Sight-holes in Locomotive Type Boilers.—Wherever the size of the boiler permits there should be a manhole in the barrel. Barrels of 3 feet and upwards in diameter must have a manhole not less than 16 inches by 11 inches in the clear. Barrels between 2 feet and 3 feet in internal diameter must have a manhole not less than 14 inches by 10 inches in the clear. Barrels below 2 feet in internal diameter must have either a manhole or a sight-hole as large as practicable. The opening must not be less than 9 inches by 6 inches. There must also be a sight-hole or hand-hole at the bottom of each corner of the fire-box casing.

From experience and practice

Wherever practicable the holes should be in the rounded corner and should be oval in shape with the major axis vertical. The holes should not be less than 6 inches by 3½ inches in the clear wherever the size of the boiler permits.

66. *Standard sizes of Man-holes*—Man-holes must be made true ellipses, standard

From British Marine Engineering Design and Construction Committee's Report. sizes being 16"×12", 15"×11", and 14"×10" in the clear.

Oval manholes in cylindrical shells must have their shorter axes arranged longi-

From Board of Trade "Standard Conditions" tudinally

67. *Standard Sizes of Mudholes and Sightholes*.—Mudholes and sightholes must

From British Marine Engineering Design and Construction Committee's Report. be true ellipses. Standard sizes are 9"×6", 7"×5", and 5"×3½".

68. *Compensation Rings to Manholes*.—Where manholes are fitted in cylindrical shells, they must have compensation rings of sufficient

From British Marine Engineering Design and Construction Committee's Report.

for not less than the same fr cut out of the shell plate. The spacing of the rivets must be such as not to weaken the shell plate to a greater extent than the longitudinal seam

From Bombay Revised Rules and Practice. The percentage of compensating section should be determined by the following formulæ—

Equation 62.

$$\frac{200 (W - D) \times Tr}{(L + 2D) \times Ts} = \text{percentage strength of compensating section.}$$

Equation 63.

Second formula is new.
$$\frac{80 \times A \times N}{(L + 2D) \times Ts} = \text{percentage strength of rivet section.}$$

W is the Width of compensation ring in inches measured on the longitudinal axis,

L is the Length of opening in shell in inches measured on the longitudinal axis,

D is the Diameter of rivet holes in inches,

Tr is the Thickness of compensation ring in inches,

Ts is the Thickness of shell plate in inches,

A is the Area of one rivet hole in inches,

N is the number of rivets on one side of the longitudinal line

Parts of raised manhole mouthpieces within four inches of the shell may, in addition to the ring, be included in the compensating section

69. *Compensation for cutting Large Holes in Shells*.—Where holes are cut in

From Board of Trade "Standard Conditions." cylindrical shells for mountings, the diameters of the holes being greater than 2½ times the thickness of the

From Bombay Revised Rules and Practice.

Where cross tubes are fitted they shall be riveted and not welded to the furnace tube. The longitudinal seams of cross tubes may be welded. *From Bombay Revised Rules and practice.* the direct impact of for cross tubes in calculating the strength of

62. *Uptakes of Vertical Boilers.*—The working pressure for uptake tubes of vertical boilers is to be determined by the formulae for plain furnaces, but only half the least pressure so found is to be allowed for uptake tubes. *From Bombay Revised Rules and practice.*

When crown plates of vertical boilers are not fitted with smoke tubes, the uptake tubes in their capacity as stays should be strong enough to satisfy the following rule:—

Equation 61.

$$W.P. = \frac{A \times S}{A_1}$$

A is the area of net section of tube or of rivets or bolts connecting uptake to furnace or shell crown plates in square inches, whichever is least

A₁ "

but in no case beyond what would be allowed under flat plate rules for margins and measured accordingly.

Where bolt stays are fitted, the surface to be supported by the uptake may be taken as that within the inner circle of the annulus supported by the stays.

S is the stress allowed per square inch of net section of material which, for the tube itself, may be 4,000 lbs and for rivets 7,000 lbs in either shear or tension.

These requirements apply equally either to flat or dished crown plates.

MANHOLES, DOORS AND STAND BLOCKS.

63 *Means for Examination and Cleaning.*—All boilers should have, where possible, means for ingress whereby examination and cleaning of the inner surfaces of plates and tubes exposed to flame may be thoroughly effected. When boilers are too small to permit of this, they must be constructed so as to be easily taken apart or there must be manholes and sightholes sufficiently large and numerous to permit of the inside being satisfactorily cleaned. *From Board of Trade "Standard Conditions"*

64. *Manholes and sightholes in Vertical Boilers.*—Where large cross tubes are fitted there must be a sighthole in the shell opposite at least one end of each tube sufficiently large to examine *From Board of Trade "Standard Conditions."* must be in addition to the three mud-

holes round the base of *From practice.*

65. *Manholes, Mudholes and Sightholes in Locomotive Type Boilers.*—Wherever the size of the boiler permits there should be a manhole in the barrel. Barrels of 3 feet and upwards in diameter must have a manhole not less than 15 inches by 11 inches in the clear. Barrels between 2 feet and 3 feet in internal diameter must have a manhole not less than 15 inches by 11 inches in the clear. Barrels below 2 feet in diameter must have a manhole as large as the fire-box casing. *From experience and practice*

or and should be oval less than 6 inches by

66. *Standard sizes of Man-holes* — Man-holes must be made true ellipses, standard

From British Marine Engineering Design and Construction Committee's Report. sizes being 16" x 22", 15" x 11", and 14" x 10" in the clear.

Oval manholes in cylindrical shells must have their shorter axes arranged longi-

From Board of Trade "Standard Conditions" tudinally.

67. *Standard Sizes of Mudholes and Sightholes* — Mudholes and sightholes must

From British Marine Engineering Design and Construction Committee's Report. be true ellipses. Standard sizes are 9" x 6", 7" x 5", and 5" x 3½".

68. *Compensation Rings to Manholes* — Where manholes are fitted in cylindrical

From British Marine Engineering Design and Construction Committee's Report. shells, they must have compensation rings of sufficient breadth and thickness properly riveted to the shell plates. The whole net sectional area of the strengthening rings and the number and area of the rivets securing them to the shell plate must in each case be sufficient to compensate for not less than the same fraction as that of the longitudinal joint of the portion cut out of the shell plate. The spacing of the rivets must be such as not to weaken the shell plate to a greater extent than the longitudinal seam.

From Bombay Revised Rules and Practice. The percentage of compensating section should be determined by the following formulae —

Equation 62.

$$\frac{200 (W - D) \times Tr}{(L + 2D) \times Ts} = \text{percentage strength of compensating section.}$$

Equation 63.

Second formula is new.

$$\frac{80 \times A \times N}{(L + 2D) \times Ts} = \text{percentage strength of rivet section.}$$

W is the Width of compensation ring in inches measured on the longitudinal axis,

L is the Length of opening in shell in inches measured on the longitudinal axis,

D is the Diameter of rivet holes in inches,

Tr is the Thickness of compensation ring in inches,

Ts is the Thickness of shell plate in inches,

A is the Area of one rivet hole in inches,

N is the number of rivets on one side of the longitudinal line

Parts of raised manhole mouthpieces within four inches of the shell may, in addition to the ring, be included in the compensating section.

69. *Compensation for cr*

From Board of Trade "Standard Conditions."

From Bombay Revised Rules and Practice.

Standard pieces are fitted and are securely riveted to the shell no additional compensation for the

hole cut in the shell is needed. If, however, the net section of the stand block or pad within four inches of the shell is less than the section of the shell plate cut away, a compensation ring must be fitted. Where a large opening is cut in a cylindrical shell to receive another part of the structure, the sides where cut away must be efficiently cross stayed or strengthened in some other effective manner.

70. Manholes and Mudholes in Flat Plates.—Where a flat plate is flanged to stiffen it at a manhole or sighthole, to permit the same working pressure as would be allowed upon an unperforated plate, the depth of the flange measured from the outer surface is to be at least equal to—

Equation 64.

$$\sqrt{T \times W.}$$

where T is the thickness of the plate in inches, and

W is the minor axis of the hole in inches.

71 Stand Blocks and Pads.—Stand blocks and pad pieces for carrying mountings should be of wrought iron or mild steel, either proportions. They and the riveting which the mounting boiler is in its

From Bombay Revised Rules and practice should be pitched tings are to be bolted working position

72 Doors, Mouthpieces and Cross Bars—All internally fitted doors of manholes, mudholes and sightholes, must be of wrought iron or steel built up or pressed to shape and annealed, or made from one thickness of plate with a machined recess for the jointing material. Their spigot part or the recess must not have a greater clearance than $\frac{1}{8}$ th inch all round, i.e., the axes must not be less than $\frac{1}{4}$ th inch smaller than the holes in which they are fitted

From Board of Trade "Standard Conditions"

The studs of all doors should be screwed through the plate and be fitted with nuts on the inside, or bolts may be used screwed through the plate with the heads inside

Manhole mouthpieces for cylindrical shells must be made of steel or wrought iron either pressed out of the solid or welded. Circular manhole mouthpieces of Lancashire type boilers should not be less than $\frac{1}{2}$ inch in thickness, and when welded the position of the weld should be at right angles to the longitudinal line. Cross Bars must be of substantial proportions and may be either solid forgings of steel or iron or be of cast steel.

From Bombay Revised Rules and practice

BOILER MOUNTINGS AND FITTINGS.

73. The Requisite Mountings and Fittings.—Every boiler must be fitted with the following.

From Bombay Revised Rules.

Two safety valves;

Two independent means of indicating the water level,

A steam pressure gauge;

A steam stop valve;

A feed check valve;

A blow down cock or valve;

An attachment for Inspector's test gauge;

A manhole, where the size and construction permit; and such mudholes or sightholes as are necessary for effecting cleaning the boiler.

It is recommended that in Lancashire and Cornish boilers one of the safety valves should be of high-steam and low-water type and that all land boilers of ordinary type should have a fusible plug in each furnace.

74. *Safety Valves.*—Safety Valves shall be not less than 1 inch in diameter From Board of Trade except in the case of very small boilers for which "Standard Conditions" valves of $\frac{3}{4}$ inch diameter are permitted.

The minimum aggregate area of safety valves of ordinary type in each boiler whether coal fired or oil fired and whether working under natural, forced or induced draught shall be found by the following formula:—

Equation 65.

$$A = H. S. \times \frac{K}{(W. P. + 16)}$$

A is the aggregate area of safety valves in square inches.

H. S. is the total heating surface of the boiler in square feet.

(See Part II Section I, clause 4)

W. P. is the working pressure in lbs. per square inch,

$K = 1.25$ for coal fired boilers and 1.5 for oil fired boilers

All the safety valves of a boiler may be fitted in one chest which must be separated in the chest

The safety valves of small locomotive type boilers with overhead engines may, on account of cramped space, be attached to the engine cylinder casing provided there is a clear short passage. From practice way of ample sectional area and structural strength between the valves and the boiler.

The openings in the boiler shell for safety valves must be left clear and uncovered on the inside and must not be connected to an internal pipe of any description. From Bombay Revised Rules

Each safety valve must have a lift at least equal to one-fourth of its effective diameter and there must be a free outlet for the waste steam. From Bombay Revised Rules.

When a ————

For
"Sta

comb. ———— of the safety valves as given by the above rule

Each large enclosed safety valve chest shall have a means of draining it, and the drain pipe shall be led clear of the boiler. From Board of Trade "Standard Conditions"

Means must be provided in every case to prevent the valves being lifted out of their seats when working. The valve seats should be secured by studs and nuts. From Bombay Revised Rules and practice

In the case of lever valves, if the holes in the lever are not bushed with brass, the pins must be of brass, iron and iron working together must not be passed

The weight of a lever and weight safety valve should be in one piece and be secured at the end of the lever against a change of position. In the case of spring loaded safety valves, washers or ferrules must be fitted under the adjusting screws so that the valves cannot be overloaded when under steam

Safety valves must be accessible and so arranged that they can be eased off their seats at any time. In the case of dead weight and spring loaded safety valves a substantial test lever for the purpose must be provided.

hole cut in the shell is needed. If, however, the net section of the stand block or pad within four inches of the shell is less than the section of the shell plate cut away, a compensation ring must be fitted. Where a large opening is cut in a cylindrical shell to receive another part of the structure, the sides where cut away must be efficiently cross stayed or strengthened in some other effective manner.

70. Manholes and Mudholes in Flat Plates.—Where a flat plate is flanged to stiffen it at a manhole or sighthole, to permit the same working pressure as would be allowed upon an unpierced plate, the depth of the flange measured from the outer surface is to be at least equal to—

Equation 64.

$$\sqrt{T \times W}.$$

where T is the thickness of the plate in inches, and

W is the minor axis of the hole in inches.

71. Stand Blocks and Pads—Stand blocks and pad pieces for carrying mountings should be of wrought iron or mild steel, either pressed or welded, and of substantial proportions. They should be carefully bedded on the shell and the riveting should be pitched to ensure a tight joint. The jointing faces to which the mountings are to be bolted should be machined and be level when the boiler is in its working position.

72. Doors, Mouthpieces and Cross Bars—All internally fitted doors of manholes, mudholes and sightholes, must be of wrought iron or steel built up or pressed to shape and annealed, or made from one thickness of plate with a machined recess for the jointing material. Their spigot part or the recess must not have a greater clearance than $\frac{1}{4}$ th inch all round *i.e.*, the axes must not be less than $\frac{1}{4}$ th inch smaller than the holes in which they are fitted.

The studs of all doors should be screwed through the plate and be fitted with nuts on the inside, or bolts may be used screwed through the plate with the heads inside.

Manhole mouthpieces for cylindrical shells must be made of steel or wrought iron either pressed out of the solid or welded. Circular manhole mouthpieces of Lancashire type boilers should not be less than $\frac{1}{2}$ inch in thickness, and when welded the position of the weld should be at right angles to the longitudinal line. Cross Bars must be of substantial proportions and may be either solid forgings of steel or iron or be of cast steel.

BOILER MOUNTINGS AND FITTINGS.

73. The Requisite Mountings and Fittings.—Every boiler must be fitted with the following.

- Two safety valves;
- Two independent means of indicating the water level;
- A steam pressure gauge;
- A steam stop valve;
- A feed check valve;
- A blow down cock or valve;
- An attachment for Inspector's test gauge;
- A manhole, where the size and construction permit; and such mudholes or sightholes as are necessary for effectively cleaning the boiler.

It is recommended that in Lancashire and Cornish boilers one of the safety valves should be of high-steam and low-water type and that all land boilers of ordinary type should have a fusible plug in each furnace.

74. Safety Valves.—Safety Valves shall be not less than 1 inch in diameter. From Board of Trade except in the case of very small boilers for which "Standard Conditions" valves of $\frac{3}{4}$ inch diameter are permitted.

The minimum aggregate area of safety valves of ordinary type in each boiler whether coal fired or oil fired and whether working under natural, forced or induced draught shall be found by the following formula:—

Equation 65

$$A = H. S. \times \frac{K}{\{W. P. + 16\}}$$

A is the aggregate area of safety valves in square inches.

H. S. is the total heating surface of the boiler in square feet.

(See Part II Section 1, clause 4)

W. P. is the working pressure in lbs per square inch.

$K=1.25$ for coal fired boilers and 1.5 for oil fired boilers

All the safety valves of a boiler may be fitted in one chest which must be separate from any other valve chest, or stand block or pad by a strong and a cross sectional area at least equal to the chest.

The safety valves of small locomotive type boilers with overhead engines may on account of cramped space, be attached to the engine cylinder casing provided there is a clear short passage way of ample sectional area and structural strength between the valves and the boiler.

The openings in the boiler shell for safety valves must be left clear and uncovered on the inside and must not be connected to an internal pipe of any description.

Each safety valve must have a lift at least equal to one-fourth of its effective diameter and there must be a free outlet for the waste steam.

Where a waste steam pipe is fitted the pipe and the passages leading to it should have a cross sectional area not less in square inches than 21 times the total heating surface of the boiler in square feet, but in no case should it be less than 1.2 times the combined areas of the safety valves as given by the above rule.

Each large enclosed safety valve chest shall have a means of draining it, and the drain pipe shall be led clear of the boiler.

Means must be provided in every case to prevent the valves being lifted out of their seats when working. The valve seats should be secured by studs and nuts.

In the case of lever valves, if the holes in the lever are not bushed with brass the pins must be of brass; iron and iron working together must not be passed.

The weight of a lever and weight safety valve should be in one piece and secured at the end of the lever against a change of position. In the case of spring loaded safety valves, washers or ferrules must be fitted under the adjusting screws so that the valves cannot be overloaded when under steam.

Safety valves must be accessible and so arranged that they can be eased off the seats at any time. In the case of dead weight and spring loaded safety valves a substantial test lever for the purpose must be provided.

The size of the steel of which the springs of direct loaded safety valves are made should be found by the following formula.

Equation 66.

$$\sqrt[3]{\frac{L \times D}{C}} = \text{Thickness of wire in inches.}$$

L is the load on the spring in pounds,

D is the diameter of the spring from centre to centre of wire in inches,

C=8,000 for round steel and 11,000 for square steel.

75. Water Gauges.—E

Adapted from Board of Trade "Standard Conditions," Bombay Revised Rules and practice.

case may be.

water gauges. For small boilers water gauges, two test cocks may be

The lowest visible part of the glass water gauge and lower test cock must be fixed at a safe working level. For locomotive type and vertical boilers this should not be less than 2 inches above the highest part of the fire box roof plate.

Glass water gauges must be placed so as to be easily seen and reached by the boiler attendant. The fittings of glass water gauges and test cocks must be of substantial make with large passage ways through them, and so constructed that an instrument can be passed through the opening whilst the boiler is under steam. The gauge cocks when open should have their handles in a vertical direction and each handle at its junction with the plug must be plainly marked with a deep line to indicate the direction of the passage way through the plug. A drain cock and pipe must be fitted to each glass water gauge. A glass guard to prevent injury to the attendant and a pointer to show the ordinary working water level must also be fitted to each glass water gauge.

76. Steam Pressure Gauge.—Each boiler shall have a separate steam pressure

From Board of Trade "Standard Conditions," Bombay Revised Rules and practice.

gauge placed where it can be easily seen. It must be marked in pounds per square inch and must have a range of not less than double the working pressure of the boiler. A red line should mark the working pressure and a syphon pipe must be fitted between the pressure gauge and the boiler.

77. Steam Stop Valve

From Bombay Revised Rules

—A steam stop valve must always be fitted between the boiler and the steam pipe and, except in the case in which a super-heater forms an integral part of the boiler itself, between the boiler and the superheater. Where two or more boilers are connected with a steam receiver or any other vessel a steam stop valve must always be fitted between the boiler and such receiver or vessel.

Such stand pipes must be of strong construction, of wrought iron, mild steel, or cast steel. The flanges of wrought iron or mild steel pipes should be riveted to the pipes, and there should be no branch on the stand pipe for any other connection.

Exception to the rule will also be made in the case of a large boiler in which it is desired to fit a tee piece for the purpose of providing a branch connection between the

stop valve and the boiler. Such a tee piece must be of strong construction, of wrought iron, mild steel, or cast steel and not exceed $2\frac{1}{2}$ diameters in height. A stop valve must be fitted direct to each tee piece branch.

78. Feed Check Valve.—The feed check valve must be attached direct to the boiler and be of combined non-return and shut down type. The valve opening in boiler or end of internal feed pipe should be above the low water level and below the working level.

79. Blow-down Cock or Valve and Pipes.—The blow down cock or valve shall be of substantial construction and if the former, shall be fitted with a locking guard and box spanner which cannot be removed until the cock is closed.

For locomotive type, vertical and marine type boilers, the cock or valve should be attached direct to the boiler. For water tube boilers the cock or valve should be outside the brickwork with a substantial steel pipe between it and the mudbox.

be attached to a block riveted to

It is recommended that the waste pipe attached to the cock or valve should not be connected to a pipe common to another boiler. It should not be bound fast in earth or brickwork.

80. Inspectors Pressure Gauge Attachment.—Every boiler must be fitted with a valve or cock carrying in a vertical position a receiving screw for the attachment of the Inspectors pressure gauge.

The cock or valve may form part of the pipe carrying the boiler pressure gauge. Where separate, it should be attached to the top of the shell near the pressure gauge.

The receiving socket shall be tapped $\frac{1}{2}$ inch Whitworth Thread and shall be fitted with an easily removable cap.

For small boilers which cannot be entered by an Inspector and which are hydraulically tested at each inspection a plug hole tapped $\frac{1}{2}$ inch Whitworth thread should be provided in a handy position for the attachment of the Inspectors test pump hose nipple.

81. Manholes, Mudholes and Sightholes.—See Section III, Clauses 63 to 72.

82. Fusible Plugs.—Plugs where fitted should be over the hottest part of the furnace or firebox. The outside and inside of the plug should be kept clean and the fusible metal should be periodically renewed.

83. Design of Boiler Mountings.—All boiler-mounting valves over $1\frac{1}{2}$ -inches diameter must have outside screws, their covers must be secured by bolts or studs, and all are to be arranged to be shut with a right hand motion of the wheels and must have means for clearly indicating whether they are open or shut.

84. Material of Valve Chests.—All stop and safety valve chests and steam pipe fittings when subjected to saturated steam only may be made of cast iron, but such valve chests and steam pipe fittings when subjected to steam of a temperature above 425 degrees Fahr. must be of cast steel or other approved material.

85. Cocks and valves to be easily seen whether open or shut.—The construction of all cocks and valves connected to the boiler must be such as to show without difficulty whether they are open or shut.

86. Studs and Bolts securing Mountings.—When boiler mountings are secured by studs or bolts, the studs or bolts must have a full threaded stud must be screw

Where bolts are used for securing mountings they must be screwed right through the plate with their heads inside the boiler.

The size of the steel of which the springs of direct loaded safety valves are made should be found by the following formula.

Equation 66.

$$\sqrt[3]{\frac{L \times D}{C}} = \text{Thickness of wire in inches.}$$

L is the load on the spring in pounds,

D is the diameter of the spring from centre to centre of wire in inches,

C=8,000 for round steel and 11,000 for square steel.

75. *Water Gauges.*—Every boiler must have two means of indicating the water level in it, and have marked on it when applicable in a contiguous position easily seen, the level of the highest part of the furnaces, fire box or combustion chamber as the case may be.

Adapted from Board of Trade "Standard Conditions," Bombay Revised Rules and practice.

water gauges. For small boilers water gauges, two test cocks may be

The lowest visible part of the glass water gauge and lower test cock must be fixed at a safe working level. For locomotive type and vertical boilers this should not be less than 2 inches above the highest part of the fire box roof plate.

Glass water gauges must be placed so as to be easily seen and reached by the boiler attendant. The fittings of glass water gauges and test cocks must be of substantial make with large passage ways through them, and so constructed that an instrument can be passed through the opening whilst the boiler is under steam. The and each keep line to and pipe purly to the be fitted

to each glass water gauge

76. *Steam Pressure Gauge*—Each boiler shall have a separate steam pressure gauge placed where it can be easily seen. It must be From Board of Trade "Standard Conditions," Bombay Revised Rules and practice.

syphon pipe must be fitted between the pressure gauge and the boiler.

77. *Steam Stop Valve*—A steam stop valve must always be fitted between the boiler and the steam pipe and, except in the case in part of the boiler reheater. Where r vessel a steam stop valve must always be fitted between the boiler and such receiver or vessel.

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Such stand pipes must be of strong construction, of wrought iron, mild steel, or cast steel. The flanges of wrought iron or mild steel pipes should be riveted to the pipes, and there should be no branch on the stand pipe for any other connection.

Exception to the rule will also be made in the case of a large boiler in which it is desired to fit a tee piece for the purpose of providing a branch connection between the

The working pressure allowed on pipes shall be determined by the following formulae.—

- (a) Solid drawn cold finished pipes (up to 28 tons tensile breaking strength).

Equation 68.

$$W. P. = \frac{(t-10)}{D} \times 120.$$

- (b) Solid drawn hot finished pipes (up to 28 tons tensile breaking strength).

Equation 69.

$$W. P. = \frac{(t-12)}{D} \times 120.$$

- (c) Welded pipes of iron or steel whether with or without covering strap.

Equation 70.

$$W. P. = \frac{(t-12)}{D} \times 90.$$

- (d) Feed delivery pipes.

Equation 71.

$$\text{Boiler Pressure} = \frac{(t-8)}{D} \times 100.$$

- (e) Pipes with riveted joints. (J being the strength of joint per cent. of the solid plate or strip).

Equation 72.

$$W. P. = \frac{(t-9)}{D} \times 12 \times J.$$

From the British Marine Engineering Design and Construction Committee's Report.

No wrought iron or steel pipe shall be less in thickness than:—

Equation 73.

$$t = 5 \times \sqrt{D} + 2.$$

D is the internal diameter of the pipe in inches,

t is the thickness of the pipe in 100ths of an inch.

90. *Rectangular Section Pipes.*—Solid drawn or welded rectangular section steel pipes for headers, cross pipes and mud drums of water tube boilers should comply generally with the requirements for ordinary steel pipes, but the hydraulic test prior to being fitted in place need only be twice the working pressure of the boiler.

The working pressure of the pipe is to be determined by the formula:—

Equation 74.

$$W. P. = \frac{25}{D} \left[3(t-4) + \frac{(t-1)^2}{D} \right]$$

t is the thickness of the pipe in 32nds of an inch,

D is the internal diameter of side of the pipe in inches.

87. *Bronze Boiler Mountings*.—The chests of blow down cocks and valves, water gauge valves and cocks, and similar fittings, must be made of good and suitable bronze. All cocks used with boilers working at 100 lbs. pressure or above should be asbestos packed and of substantial design and make.

From the British Marine Engineering Design and Construction Committee's Report.

PIPES AND TUBES.

Steam and Water Pipes subject to Internal Pressure.

88. *Copper Tubes and Pipes*.—No pipe made from the electro-deposition of copper on a mandril shall be used for steam or feed delivery. All copper pipes must be properly annealed before putting in place. All copper steam and feed pipes subject to a pressure over 75 lbs. per square inch shall be solid drawn.

No steam pipe intended for a working pressure of over 180 lbs. per square inch shall be made of copper when the internal diameter exceeds 5 inches. No copper pipe shall be used for super heated steam.

All copper steam pipes on completion and prior to being fitted in place shall be subjected to hydraulic test to at least twice the working pressure.

For all feed delivery pipes the test pressure shall be $2\frac{1}{2}$ times the working pressure allowed on the boilers.

The working pressure of copper pipes shall be determined by the following formula—

Equation 67.

$$W. P. = \frac{(t-3)}{D} \times C.$$

D is the internal diameter of the pipe in inches.

t is the thickness of the pipe, in 100ths of an inch.

C = 6 for solid drawn steam pipes.

45 for brazed steam pipes.

48 for solid drawn feed pipes, and

36 for brazed feed pipes.

When copper pipes are bent they must be made thicker to provide for thinning at the bend. In no case should the radius of curvature at the centre line of the pipe be less than twice the external diameter of the pipe.

89. *Wrought Iron and Steel Pipes*.—Steam and other pipes may be made of wrought iron or wrought steel.

From Board of Trade "Standard Conditions."

The process of welding the seams shall be by hammering or rolling the joint.

On completion of any work which involves heating, whether for welding the joint, welding on flanges, hot bending the pipe, or for any other purpose, the pipe shall be carefully annealed.

Mild steel for lap-welded steam pipes and tubes may have a tensile breaking strength not exceeding 23 tons per sq. inch, with a minimum elongation of 25 per cent on the standard test piece. Feed pipes if made of steel should be solid-drawn and cold finished.

All iron or steel steam pipes and tubes prior to being fitted in place shall be subjected to hydraulic test to at least 3 times the working pressure.

All iron or steel feed delivery pipes shall be hydraulically tested to at least 4 times the working pressure of the boiler.

From the British Marine Engineering Design and Construction Committee's Report.

94. *Size and Thickness of Flanges.*—The size and thickness of flanges and the number and size of their bolts shall be as prescribed by the Rules of the British Engineering Standards Association.

95. *Flanges of Copper Pipes.*—Flanges of copper pipes may be made of the usual brass or bronze or of wrought iron or of wrought or cast steel.

96. *Flanges of Iron and Steel Pipes.*—Flanges of iron and steel pipes may be made of cast steel, wrought iron or wrought steel made without a weld. When pipes are not more than 20/100 inch thick and not more than 9 inches in inside diameter they may be expanded by rollers into a flange having a series of recesses formed within it. When pipes are over 18/100 inch thick and not more than 12 inches in internal diameter they may be screwed into the flanges with a disappearing thread.

Flanges may be riveted, when practicable, to pipes of all sizes the thickness of which exceeds 20/100 inch.

made	cess to pipes
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From the British Marine Engineering Design and Construction Committee's Report.

97. *Cast Metal Pipes and their Equivalents as Cylindrical Parts of Mountings and Fittings.*—The above mentioned mountings and fittings may be made of cast steel, cast iron, or bronze.

98. *Cast Steel Chests, etc.*—Cast Steel shall be used instead of cast iron when the temperature to which they are exposed when at work exceeds 425 degrees Fahr.

Generally such steel castings should be made of a material of the following composition:

per cent. in 2 inches.

When machined and ready for fitting in place they shall be subjected to a hydraulic test equal to 3 times the working pressure which they may have to bear.

Steel castings which will be subject to the action of feed water should be made of steel of which the manganese content does not exceed .1 per cent.

99. *Cast Iron Chests, etc.*—Cast iron for boiler mountings and fittings exposed to pressures exceeding 75 lbs. per square inch should have a tensile breaking strength of not less than 9 tons per square inch, and be subject to the following test.—

Bars 1½ inches square in section placed on knife-edged supports 6 inches apart shall withstand without fracture the impact of a 21 lbs weight dropped four times from a height of 16 inches.

100. *Bronze Chests, etc.*—Bronze for all mountings and fittings should be of the Admiralty Composition, viz., Cu. 87.5, Sn. 10, Zn. 2, and Pb. .5 when subject to a temperature exceeding 350 degrees Fahr.

Other good bronzes may be used for mountings and fittings if they are shown to be equally satisfactory.

Such bronzes shall have an ultimate tensile breaking strength of not less than 14 tons per square inch with an elongation of 10 per cent. in 2 inches when at a temperature of 550 degrees Fahr.

Good commercial bronze for general purposes should have a tensile breaking strength of not less than 14 tons per square inch with an elongation of 10 cent. in 2 inches when at a temperature of 350 degrees Fahr.

SMOKE TUBES.

Steel and Wrought Iron Tubes.

91. *Material and Method of Manufacture*—Both plain and stay smoke tubes adapted from Board of Trade "Standard Conditions." may be made either of wrought iron or of mild steel welded.

92 *Working Pressure for Plain and Stay Tubes.*—The working pressure for plain and stay tubes (as tubes not as stays) is to be determined by the following formula. No tube is to be less than 11 S. W. G. thick.

Equation 75.

$$W. P. = \frac{10,000 (t - .085)}{D}$$

T is the thickness of tubes in inches,

D is the external diameter of the tube in inches.

Diameters and thicknesses of Plain and Stay Tubes.—The following table may be worked to—

External diameter in inches.	Standard thickness in L. S. G. and fractions of an inch and Suitable Working Pressure				
	11 (116)"	10 (128)"	9 (144)"	8 (160)"	7 (176)"
1"	310	430
1½"	250	315	470
1¾"	210	285	390	500	...
1½"	180	245	335	430	500
2"	155	215	300	375	415
2½"	140	190	260	315	395
2¾"	125	175	230	300	350
3"	110	160	215	275	325
3½"	100	140	190	250	300
3¾"	95	130	180	230	280
4"	90	120	165	215	260

93. Brass and Copper

From the National Boiler Insurance Company's Rules.

external diameter inclusive inclusive, the thickness at (116 inch) and 9 S. W. G. (144 inch) at the other.

From the British Marine Engineering Design and Construction Committee's Report.

94. *Size and Thickness of Flanges.*—The size and thickness of flanges and the number and size of their bolts shall be as prescribed by the Rules of the British Engineering Standards Association.

95. *Flanges of Copper Pipes.*—Flanges of copper pipes may be made of the usual brass or bronze or of wrought iron or of wrought or cast steel.

96. *Flanges of Iron and Steel Pipes.*—Flanges of iron and steel pipes may be made of cast steel, wrought iron or wrought steel made without a weld. When

thread

Flanges may be riveted, when practicable, to pipes of all sizes the thickness of which exceeds 20/100 inch.

made or to any suitable process to pipes the flanges are made of iron or steel. When flanges are attached to pipes by brazing or welding they shall be also secured in such additional way, e.g., by riveting the ends or forming a conical end so as to fit into a conical bore in the flange) that the resistance to withdrawal from the flange does not depend wholly on the brazing or welding.

From the British Marine Engineering Design and Construction Committee's Report.

97. *Cast Metal Pipes and their Equivalents as Cylindrical Parts of Mountings and Fittings.*—The above mentioned mountings and fittings may be made of cast steel, cast iron, or bronze.

98. *Cast Steel Chests, etc.*—Cast Steel shall be used instead of cast iron when the temperature to which they are exposed when at work exceeds 425 degrees Fahr.

Generally such steel castings should be made of a metal, the tensile breaking strength of which is not less than 23 nor more than 35 tons per square inch with an elongation of 15 per cent. in 2 inches. When the castings are intricate the tensile breaking strength may be higher so long as the elongation is not less than 12½ per cent. in 2 inches.

When machined and ready for fitting in place they shall be subjected to a hydraulic test equal to 3 times the working pressure which they may have to bear.

Steel castings which will be subject to the action of feed water should be made of steel of which the manganese content does not exceed 1 per cent.

99. *Cast Iron Chests, etc.*—Cast iron for boiler mountings and fittings exposed to pressures exceeding 75 lbs. per square inch should have a tensile breaking strength of not less than 9 tons per square inch, and be subject to the following test.—

Bars 1½ inches square in section placed on knife-edged supports 6 inches apart shall withstand without fracture the impact of a 21 lbs weight dropped four times from a height of 15 inches.

100. *Bronze Chests, etc.*—Bronze for all mountings and fittings should be of the Admiralty Composition, viz., Cu. 87½, Sn. 10, Zn. 2, and Pb. 5 when subject to a temperature exceeding 350 degrees Fahr.

Other good bronzes may be used for mountings and fittings if they are shown to be equally satisfactory.

Such bronzes shall have an ultimate tensile breaking strength of not less than 14 tons per square inch with an elongation of 10 per cent. in 2 inches when at a temperature of 550 degrees Fahr.

Good commercial bronze for general purposes should have a tensile breaking strength of not less than 14 tons per square inch with an elongation of 10 per cent. in 2 inches when at a temperature of 350 degrees Fahr.

Such bronze castings must be certified by the manufacturers as possessing tested to twice pressure, with

All such chests and fittings must be smooth, sound and free from flaws, cracks, blow-holes or other injurious defects. Their working pressure and thickness shall be determined by the following formulæ—

Equation 76.

$$W. P. = \frac{(t - X)}{D} \times C.$$

Equation 77

$$t = \frac{W. P. \times D}{C} + X.$$

The minimum thickness of cast metal chests, etc, and their equivalents shall be :—

When of Cast steel, $t = 2.5\sqrt{D} + 6$

When of Cast iron, $t = 2.5\sqrt{D} + 4$

When of Cast Bronze, $t = 2.5\sqrt{D} + 2$

D is the internal diameter of the chest in inches,

t is the thickness of the chest in 32nds of an inch,

C is a co-efficient from the following table,

X is a provision for toleration, etc, from the following table.

Table of Values of C. and X.

Material of casting	C	X.
Cast steel, 28/35 tons tensile strength	400	6
Cast iron, at least 9 tons tensile strength	200	6
Bronze, Admiralty and equally good	220	4
Bronze, good mercantile	175	4
Bronze, Commercial, quality unknown	150	4

Diagrams of Riveted Joints with Formulae.

SINGLE RIVETED JOINTS.

LAP JOINT. ONE RIVET PER PITCH.

FIG. 1.

$$\text{Max. Pitch} = 1.31 \times T + 1.625.$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times S_1}{P \times T \times S}$$

$$E = 1.5 \times D$$

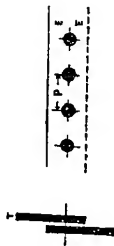


FIG. 2.

SINGLE BUTT STRAP, ONE RIVET PER PITCH.

$$\text{Max. Pitch} = 1.53 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times S}{P \times T \times S}$$

$$E = 1.5 \times D$$

$$\text{BUTT STRAP} = 1.25 \times T$$

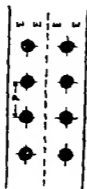


FIG. 3.

DOUBLE BUTT STRAP. ONE RIVET PER PITCH.

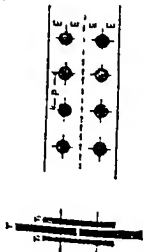
$$\text{Max. Pitch} = 1.75 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 1.875 \times S_1}{P \times T \times S}$$

$$E = 1.5 \times D$$

$$\text{BUTT STRAPS} = .625 \times T$$



DOUBLE RIVETED JOINTS.

LAP JOINT, TWO RIVETS PER PITCH.

FIG. 4.

$$\text{Max. Pitch} = 2.62 \times T \times 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 2 \times S}{P \times T \times S}$$

$$R = .33 P + .67 D$$

$$E = 1.5 \times D$$

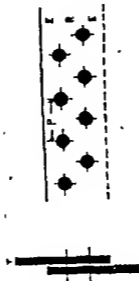


FIG. 5.

LAP JOINT. TWO RIVETS PER PITCH.

$$\text{Max. Pitch} = 2.62 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 2 \times S_1}{P \times T \times S}$$

$$R = 2 \times D$$

$$E = 1.5 \times D$$

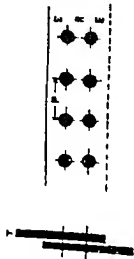


FIG. 6. SINGLE BUTT STRAP. TWO RIVETS PER PITCH.

$$\text{Max. Pitch} = 3.06 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 2 \times S_1}{P \times T \times S}$$

$$R = .33 P + .67 D$$

$$E = 1.5 \times D$$

$$\text{BUTT STRAP} = 1.125 \times T$$

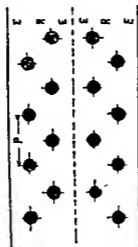


FIG. 7.

SINGLE BUTT STRAP, TWO RIVETS PER PITCH.

$$\text{Max. Pitch} = 3.06 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P-D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 2 \times S_1}{P \times T \times S}$$

$$R = 2 \times D$$

$$E = 1.5 \times D$$

$$\text{BUTT STRAP} = 1.125 \times T$$

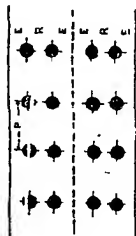


FIG. 8.

SINGLE BUTT STRAP. THREE RIVETS PER PITCH.

$$\text{Max. Pitch} = 4.05 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 3 \times S_1}{P \times T \times S}$$

$$\text{Combined \%} = \frac{100 (P - 2D)}{P} + \frac{100 \times A \times S_1}{P \times T \times S}$$

$$R = .2 P + 1.15 D$$

$$E = 1.5 \times D$$

$$\text{BUTT STRAP} = 1.125 T \times \frac{(P - D)}{(P - 2D)}$$

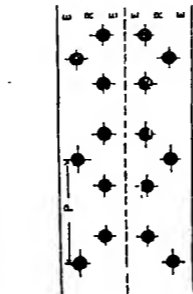


FIG. 9.

SINGLE BUTT STRAP. THREE RIVETS PER PITCH.

$$\text{Max. Pitch} = 4.05 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P-D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 3 \times S_1}{P \times T \times S}$$

$$\text{Combined \%} = \frac{100 (P-2D)}{P} + \frac{100 \times A \times S_1}{P \times T \times S}$$

$$R = .33 P + .67 D$$

or $2 \times D$ whichever is greater.

$$E = 1.5 \times D$$

$$\text{BUTT STRAP} = 1.125 T \times \frac{(P-D)}{(P-2D)}$$

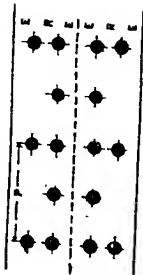


FIG. 10.

DOUBLE BUTT STRAP. TWO RIVETS PER PITCH.

$$\text{Max. Pitch} = 3.5 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 2 \times 1.875 \times S_1}{P \times T \times S}$$

$$R = .33 P + .67 D$$

$$E = 1.5 \times D$$

$$\text{Butt Straps} = .625 \times T$$

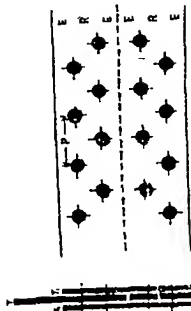


FIG. 11.

DOUBLE BUTT STRAPS. TWO RIVETS PER PITCH.

$$\text{Max. Pitch} = 3.5 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 2 \times 1.875 \times S_1}{P \times T \times S}$$

$$R = 2 \times D$$

$$E = 1.5 \times D$$

$$\text{BUTT STRAITS} = .025 \times T$$

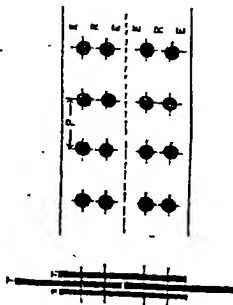


FIG. 12.

DOUBLE BUTT STRAP. THREE RIVETS PER PITCH.

$$\text{Max. Pitch} = 4.63 \times T + 1.625.$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 3 \times 1.875 \times S_1}{P \times T \times S}$$

$$\text{Combined \%} = \frac{100 (P - 2D)}{P} + \frac{100 \times A \times 1.875 \times S_1}{P \times T \times S}$$

$$R = .2 P + 1.15 D$$

$$E = 1.5 \times D$$

$$\text{BUTT STRAPS} = 625 T \times \frac{(P - D)}{(P - 2D)}$$

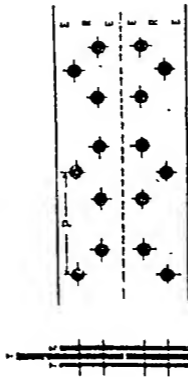


FIG. 13.

DOUBLE BUTT STRAP. THREE RIVETS PER PITCH.

$$\text{Max. Pitch} = 4.63 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 3 \times 1.875 \times S_1}{P \times T \times S}$$

$$\text{Combined \%} = \frac{100 (P - 2 D)}{P} + \frac{100 \times A \times 1.875 \times S_1}{P \times T \times S}$$

$$R = .33 P + .67 D$$

or 2 \times D whichever is greater.

$$E = 1.5 \times D$$

$$\text{BUTT STRAPS} = .625 T + \frac{(P - D)}{(P - 2 D)}$$

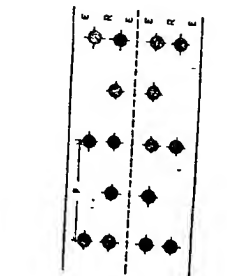


FIG. 14. DOUBLE BUTT STRAPS OF UNEQUAL WIDTH. TWO RIVETS PER PITCH.

$$\text{Max. Pitch} = 3.5 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 2.875 \times S_1}{P \times T \times S}$$

$$R = .33 P + .67 D$$

$$E = 1.5 \times D$$

$$\text{BUTT STRAP} = .75 T$$

(WIDE.)

$$\text{BUTT STRAP} = .625 T$$

(NARROW.)

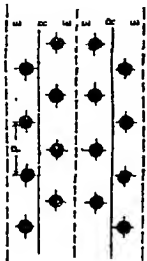


FIG. 15. DOUBLE BUTT STRAPS OF UNEQUAL WIDTH. TWO RIVETS PER PITCH.

$$\text{Max. Pitch} = 3.5 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 2.875 \times S_1}{P \times T \times S}$$

$$R = 2 \times D$$

$$E = 1.5 \times D$$

$$\text{BUTT STRAP} = .75 T$$

(WIDE).

$$\text{BUTT STRAP} = .625 T$$

(NARROW).

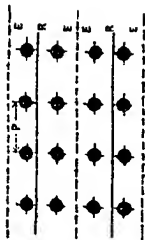


FIG. 16. DOUBLE BUTT STRAPS OF UNEQUAL WIDTH. THREE RIVETS PER PITCH.

Max. Pitch	$= 4.63 \times T + 1.625$
Plate %	$= \frac{100 (P - D)}{P}$
Rivet %	$= \frac{100 \times A \times 4.75 \times S_1}{P \times T \times S}$
Combined %	$= \frac{100 (P - 2 D)}{P} + \frac{100 \times A \times S_1}{P \times T \times S}$
R	$= .2 P + 1.15 D$
E ₁	$= 1.5 \times D$
Butt Strap (WIDE)	$= .75 T \times \frac{(P - D)}{(P - .2 D)}$
Butt Strap (NARROW)	$= .625 T \times \frac{(P - D)}{(P - .2 D)}$

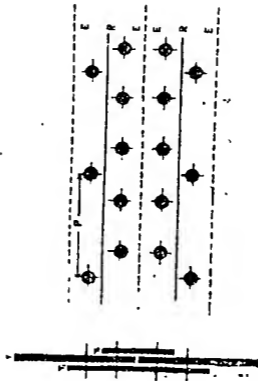


FIG. 17. DOUBLE BUTT STRAPS OF UNEQUAL WIDTH. THREE RIVETS PER PITCH.

$$\text{Max. Pitch} = 4.63 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 4.75 \times S_1}{P \times T \times S}$$

$$\text{Combined \%} = \frac{100 (P - 2 D)}{P} + \frac{100 \times A \times S_1}{P \times T \times S}$$

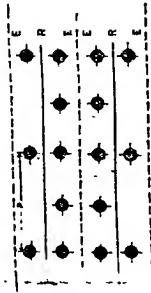
$$R = .33 P + .67 D \text{ or } 2 D$$

whichever is greater.

$$E = 1.5 \times D$$

$$\text{Butt Strap (wide).} = .75 T \times \frac{(P - D)}{(P - 2 D)}$$

$$\text{Butt Strap (narrow).} = .625 T \times \frac{(P - D)}{(P - 2 D)}$$



TREBLE RIVETED JOINTS.

LAP JOINT. THREE RIVETS PER PITCH.

$$\text{Max. Pitch} = 3.47 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 3 \times S}{P \times T \times S}$$

$$R = .33 P + .67 D$$

$$E = 1.5 \times D$$

FIG. 18.

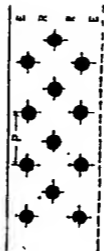


FIG. 10.

LAP JOINT. THREE RIVETS PER PITCH.

$$\text{Max. Pitch} = 3.47 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 3 \times S_1}{P \times T \times S}$$

$$R = 2 \times D$$

$$E = 1.5 \times D$$



FIG. 20.

LAP JOINT. FOUR RIVETS PER PITCH.

Max. Pitch	$\approx 4.14 \times T + 1.625$
Plate %	$\approx \frac{100 (P - D)}{P}$
Rivet %	$\approx \frac{100 \times A \times 4 \times S_1}{P \times T \times S}$
Combined %	$\approx \frac{100 (P - 2 D)}{P} + \frac{100 \times A \times S_1}{P \times T \times S}$
R	$\approx .2 P + 1.15 D$
E	$\approx 1.5 \times D$



FIG. 21.

LAP JOINT, FOUR RIVETS PER PITCH.

$$\text{Max. Pitch} = 4.14 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 4 \times S_1}{P \times T \times S}$$

$$\text{Combined \%} = \frac{100 (P - 2 D)}{P} + \frac{100 \times A \times S_1}{P \times T \times S}$$

$$R = .33 P + .67 D \text{ or } 2 D$$

whichever is greater.

$$E = 1.5 \times D$$



FIG. 22.

DOUBLE BUTT STRAP. THREE RIVETS PER PITCH.

$$\begin{aligned}
 \text{Max. Pitch} &= 4.63 \times T + 1.65 \\
 \text{Plate \%} &= \frac{100 (P-D)}{P} \\
 \text{Rivet \%} &= \frac{100 \times A \times 3 \times 1.875 \times S_1}{P \times T \times S} \\
 R &= .33 P + .67 D \\
 E &= 1.5 \times D \\
 \text{BUTT STRAPS} &= .625 T
 \end{aligned}$$

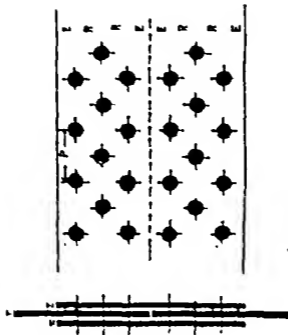


Fig. 23.

DOUBLE BUTT STRAP. THREE RIVETS PER PITCH.

$$\text{Max. Pitch} = 4.63 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P-D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 3 \times 1.875 \times S_1}{P \times T \times S}$$

$$R = 2 \times D$$

$$E = 1.5 \times D$$

$$\text{Butt Straps} = .625 T$$

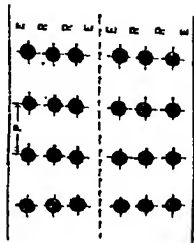


FIG. 24.

DOUBLE BUTT STRAP. FOUR RIVETS PER PITCH.

$$\text{Max. Pitch} = 5.52 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 4 \times 1.875 \times S_1}{P \times T \times S}$$

$$\text{Combined \%} = \frac{100 (P - 2 D)}{P} + \frac{100 \times A \times 1.875 \times S_1}{P \times T \times S}$$

$$R = .2 P + 1.15 D$$

$$E = 1.5 \times D$$

$$\text{BUTT STRAPS} = .625 T \times \frac{(P - D)}{(P - 2 D)}$$

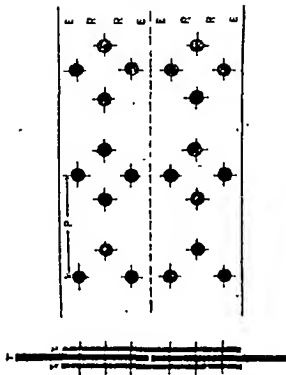


FIG. 25.

DOUBLE BUTT STRAP. FOUR RIVETS PER PITCH.

$$\text{Max. Pitch} = 5.52 \times T + 1.625$$

$$\text{Plate} \% = \frac{100 (P - D)}{P}$$

$$\text{Rivet} \% = \frac{100 \times A \times 1 \times 1.875 \times S_1}{P \times T \times S}$$

$$\text{Combined \%} = \frac{100 (P - 2 D)}{P} + \frac{100 \times A \times 1.875 \times S_1}{P \times T \times S}$$

$$R = .33 P + .67 D \text{ or } 2 D$$

whichever is greater.

$$E = 1.5 \times D$$

$$\text{BUTT STRAPS} = .625 T \times \frac{(P - D)}{(P - 2 D)}$$

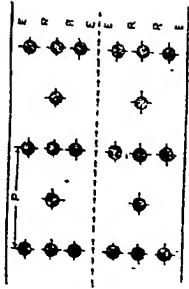


FIG. 26.

DOUBLE BUTT STRAP. FIVE RIVETS PER PITCH.

$$\text{Max. Pitch} = 6 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 5 \times 1.875 \times S_1}{P \times T \times S}$$

$$\text{Combined \%} = \frac{100 (P - 2 D)}{P} + \frac{100 \times A \times 1.875 \times S_1}{P \times T \times S}$$

$$R_1 = .2 P + 1.15 D$$

$$R_2 = .165 P + .67 D$$

$$E = 1.5 \times D$$

$$\text{BUTT STRAPS} = .625 T \times \frac{(P - D)}{(P - 2 D)}$$

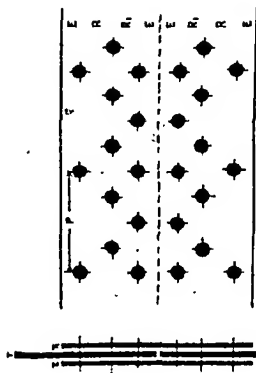


FIG. 27.

DOUBLE BUTT STRAP, FIVE RIVETS PER PITCH.

$$\text{Max. Pitch} = 0 \times T + 1.625$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 5 \times 1.875 \times S_1}{P \times T \times S}$$

$$\text{Combined \%} = \frac{100 (P - 2D)}{P} + \frac{100 \times A \times 1.875 \times S_1}{P \times T \times S}$$

$$R = .33 P + .67 D \text{ or } 2 D$$

whichever is greater.

$$R_1 = 2 \times D$$

$$E = 1.5 \times D$$

$$\text{BUTT STRAPS} = 623 T \times \frac{(P - D)}{(P - 2 D)}$$

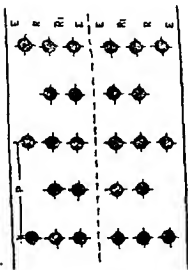


FIG. 28. DOUBLE BUTT STRAPS OF UNEQUAL WIDTH. THREE RIVETS PER PITCH.

$$\begin{aligned}
 \text{Max. Pitch} &= 4.63 \times T + 1.625 \\
 \text{Plate \%} &= \frac{100 (T - D)}{P} \\
 \text{Rivet \%} &= \frac{100 \times A \times 4.75 \times S_1}{P \times T \times S} \\
 R &= .33 P + .67 D \\
 E &= 1.5 \times D \\
 \text{BUTT STRAPS} &= .75 T \\
 &\quad (\text{WIDE}). \\
 \text{BUTT STRAPS} &= .625 T \\
 &\quad (\text{NARROW}).
 \end{aligned}$$

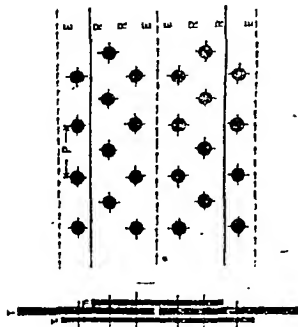


FIG. 29. DOUBLE BUTT STRAPS OF UNEQUAL WIDTH. THREE RIVETS PER PITCH.

$$\begin{aligned} \text{Max. Pitch} &= 4.63 \times T \times 1.625 \\ \text{Plate \%} &= \frac{100 (P-D)}{P} \\ \text{Rivet \%} &= \frac{100 \times A \times 4.75 \times S}{P \times T \times S} \\ R &= 2 \times D \\ E &= 1.5 \times D \\ \text{BUTT STRAPS} &= .75 T \\ &\quad \text{(WIDE)} \\ \text{BUTT STRAPS} &= .625 T \\ &\quad \text{(NARROW).} \end{aligned}$$

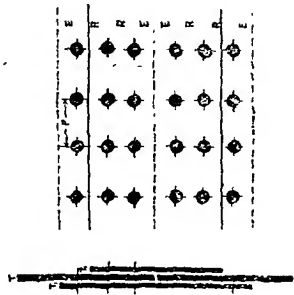


FIG. 30. DOUBLE BUTT STRAPS OF UNEQUAL WIDTH. FIVE RIVETS PER PITCH.

Max. Pitch	=	$6 \times T + 1.625$
Plate %	=	$\frac{100 (P-D)}{P}$
Rivet %	=	$\frac{100 \times A \times 8.5 \times S_1}{P \times T \times S}$
Combined %	=	$\frac{100 (P-2 D)}{P} + \frac{100 \times A \times S_1}{P \times T \times S}$
R	=	$.2 P + 1.15 D$
R ₁	=	$.165 P + .67 D$
E	=	$1.5 \times D$
BUTT STRAPS (WIDE).	=	$.75 T \times \frac{(P-D)}{(P-2 D)}$

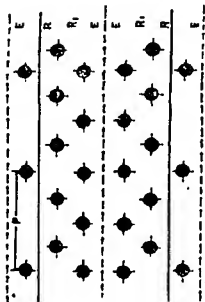


FIG. 31. DOUBLE BUTT STRAPS OF UNEQUAL WIDTH. FIVE RIVETS PER PITCH.

$$\text{Max. Pitch} = 6 \times T + 1.025$$

$$\text{Plate \%} = \frac{100 (P - D)}{P}$$

$$\text{Rivet \%} = \frac{100 \times A \times 8.5 \times S_1}{P \times T \times S}$$

$$\text{Combined \%} = \frac{100 (P - 2 D)}{P} + \frac{100 \times A \times S_1}{P \times T \times S}$$

$$R = .33 P + .67 D \text{ or } 2 D$$

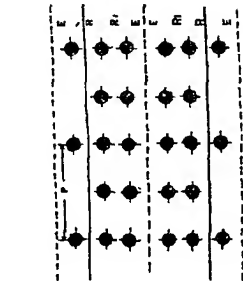
whichever is greater.

$$R_1 = 2 \times D$$

$$E = 1.5 \times D$$

$$\text{BUTT STRAPS (WIDE)} = .75 T \times \frac{(P - D)}{(P - 2 D)}$$

$$\text{BUTT STRAPS (NARROW)} = .625 T \times \frac{(P - D)}{(P - 2 D)}$$



Part II.—Inspection.

SECTION I.—REGULATIONS FOR THE REGISTRATION AND INSPECTION OF BOILERS.

1. *Duties of Inspectors.*—Inspectors are required by the Act to measure and examine boilers for registration, examine boilers for renewal certificates, determine, subject to the approval of the Chief Inspector, the pressures at which they are to be allowed to work, grant certificates therefor, and generally convey to the owners such orders as the Chief Inspector may issue. See Section 8 of the Act.

2. *Preparation for Inspection (prescribed under Section 10 (2) (b) of the Act)*—At every inspection of a boiler for the grant or renewal of a certificate the boiler shall be empty and thoroughly clean in all its parts, all doors of manholes,

valves and cocks comprising the boiler mountings must be opened up and taken apart and the valves or cocks ground when necessary, before the Inspector's visit.

Provision should be made for the removal of lagging or brickwork or other concealing part and for the drilling of plates, if required by the Inspector, and for verifying the pressure gauge and safety valve dimensions and weights.

All smoke tubes, smoke-boxes, and external flues must be swept clean.

Provision must be made for the effective disconnection of all steam and hot water communication with any other boiler under steam. This must be effected either by the
y must
blank
needed
cted to
every
case wherein a person is sent or with the assent of the owner or person in charge goes into a boiler for any purpose. *Vide* section 27 (g) of the Act.

3. *Preparation for hydraulic test (prescribed under Section 10 (2) (b) of the Act).*—The chests of all mountings subject to steam pressure should be in place and shut tight or blank flanged. The safety valves should either be jammed down or removed and the chest-opening blank flanged. The attachment for the Inspector's pressure gauge and the nipple, when provided, for connecting the Inspector's test pump hose should be in order. All doors should be properly jointed and tightened up. The boiler should be completely filled with water, care being taken to allow all air to escape and, if possible, a preliminary test not exceeding the working pressure of the boiler should be taken before the Inspector's visit to test the tightness of the joints.

4. *Measurement of Heating Surface.*—The area of the heating surface of a

surface shall include the wetted surface of the furnaces between the end plates and of cross tubes, where fitted; and the part of the external shell below the side flue covers. In estimating the areas, furnaces may be considered as plain cylinders; the area of their wetted surface is to be taken as their mean external circumference \times the length of the boiler between end plates. For the shell the width of that part of the circumference below the flue covers is to be taken as $=2 D$, and this width \times the length between end plates is to be taken as the area of shell heating surface. The part of the surface of the back end plate exposed to heat is to be neglected.

The formula for the total heating surface of a Lancashire boiler having plain furnaces without cross tubes is therefore: H. S. in square feet $= 2L (3.14d - D)$. L

is the length of the boiler between end-plates in feet, d is the mean external diameter of the largest belt of shell in feet.

For steam and water drums of water tube boilers the wetted part of the drum circumference is to be taken as πD . The length L as the clear length of drum between the outer brick walls. The surface of the tubes is to be taken as the internal wetted surface of each tube between headers or tube plates. The heating surface of the headers is to be neglected.

For marine type boilers the heating surface shall include the wetted surface of Lancashire tube holes) the front tube plate exposed to heat are to be neglected.

For locomotive type boilers the heating surface shall include the wetted surface of the fire-box above the foundation ring (less the area of the tubes and the firehole and ring) and the wetted surface of the tubes between tube plates. The smoke box tube plate is to be neglected.

For vertical boilers of all types the heating surface shall include the wetted surface provided for in the foregoing instructions the same general procedure should be observed. No deduction should be made for stays, etc., in calculating the heating surface

5. *Boiler Rating and Registration Fee (vide Section 27 (d) and Section 8 (1) of the Act).*—The boiler rating to be entered in the certificate shall be the number of square feet, (to the nearest whole figure) in the heating surface of the boiler as determined under clause 4 of this Section.

The fee for the registration of each boiler shall be :—

	Rs.
for Boiler Rating not exceeding 100	40
" " " exceeding 100 but not exceeding 300	50
" " " " 300 " " " 500	60
" " " " 500 " " " 700	70
" " " " 700 " " " 900	80
" " " " 900 " " " 1100	90
" " " " 1100	100

The registration fee shall cover the thorough inspection, hydraulic test, verification of registry number and steam test, subject to the provisions of Section 10 (3) of the Act. In cases where the boiler has not been properly prepared, the Chief Inspector shall have the power to remit the whole or part of the additional fees required under the above Section.

6. *Procedure for Registration.*—On receipt of an application for registration under Section 8 (1) of the Act the Inspector shall, when the boiler has been properly prepared for inspection, proceed to measure in complete detail all its parts, ascertain the working pressure allowed by the Regulations by making a series of calculations of the strength of the various parts, such calculations being based on his measurements and on the dimensions and other particulars relating to the material and construction stated in the maker's certificate, if satisfied with

I, clause 1 of full examination construction of necessary, bore the calculations he shall be guided by the requirements of sections 1, 11 and 111 of Part I of the Regulations.

If no formula or co-efficient, applicable to any part, be contained in Part I, Section III of the Regulations, the Chief Inspector shall, in his discretion, determine the fitness of such part.

The strength of the weakest part so calculated or determined, subject to any discretionary power exercised by the Chief Inspector, shall determine the permissible working pressure of the boiler. After carefully inspecting the boiler and ascertaining by the prescribed calculations the maximum pressure at which the boiler may be worked, the Inspector shall hydraulically test it in accordance with the requirements of clause 12 of this section and may issue a provisional order under section 12 (1) of the Act. The above particulars and dimensions of the boiler and calculations of

under section 8 (d) (c) and (4) of the Act.

On completion of the first thorough inspection, measurement and hydraulic test of the boiler the Chief Inspector shall, if satisfied with the result, allot a Registry number under Section 8 (3) (b) and issue his orders under section 8 (3) of the Act, but the registration and examination under section 8 of the Act shall not be complete until the engraving of the Registry number of the boiler under section 8 (4) of the Act has been verified by the Inspector.

Bihar and Orissa	B. O.
Bengal	B. L.
Bombay	B. Y.
Burma	B. A.
Central Provinces	C. P.
Madras	M.
Punjab	P. B.
United Provinces	U. P.

(d)
plate
each

The whole shall be enclosed in a rectangle the upper and lower sides of which shall be 3 inches apart and one quarter of an inch clear of the top of the letters and bottom of the figures respectively, as indicated below. The side lines shall be an equal

distance clear from the figures.



The engraving shall be not less than one sixty-fourth of an inch in depth. In the case of small boilers the letters and figures of the device may, in the discretion of the Chief Inspector, be reduced to three-eighths of an inch in height.

Boilers having registry devices differing from those prescribed herein shall, on these Regulations coming into force, have such devices obliterated, altered or cut anew in conformity with those prescribed above. The original numbers of such boilers shall be retained in the new device. A number once allotted to a boiler shall not be used again for another boiler.

8. *Memorandum of Inspection Books* (prescribed under section 8 (2) of the

When such are made, with their
been cleared of brick-
they should also note all
inspection of repairs or
the boiler's history for the
tion.

Inspectors shall, as soon as convenient after an inspection, make the necessary entries in the Memorandum of Inspection books, care being taken to preserve and
For newly
ulations and
ler. For old
oposals made
for repairs or reduction of pressure under the proviso to Section 11 of the Act. A
pressure once approved for a boiler is not to be altered without the written authority
of the Chief Inspector. Inspection books except when actually required by the
Inspector are to be filed in the office of the Chief Inspector

9. *Registration Books*—A registration book containing all the particulars

registration book under his initials.

The Registration Book, on a boiler passing from one part of India to another, shall on the request of the Chief Inspector of the Province to which the boiler has been transferred, be forwarded to that officer who shall take over its custody and maintain it as prescribed above.

10. *Procedure at Subsequent Inspections*.—At subsequent inspections the Inspector should carefully gauge and record the circularity of furnaces of boilers having cylindrical furnaces. A vertical and an horizontal gauging should always be taken of

longitudinal seams.

In making his calculations for a wasted part of a boiler shell, e.g., along the line of seating blocks of a Lancashire boiler, the Inspector should use the ordinary shell pressure formula without J, the percentage strength of joint.

When the Inspector decides that a boiler in one or more of its parts is no longer fit for the pressure approved for it, he must, without delay, report his proposals for reducing the pressure to the Chief Inspector and at the same time submit his calculations for the wasted parts for check and approval of pressure.

Generally at a thorough inspection of a boiler the Inspector must, wherever the size permits, go inside it and make a thorough inspection of all its internal parts

Before doing so, however, he should satisfy himself that proper provision has been made for disconnection from any other boiler under steam. Should he find that proper provision for disconnection has not been made or that the boiler has not been properly cleaned or scaled or that it is unreasonably hot he should decline to proceed with the inspection and should report the facts to the Chief Inspector for orders, under Section 10 (3) of the Act.

particular attention should be paid to the external parts of boilers in way of seating blocks, especially when the situation is damp and, having regard to many serious defects discovered, Inspectors should take care, in order to ensure proper inspection, that boilers the whole of the inside of which cannot be readily examined are cleared whenever they consider it necessary of any concealing, covering, supports or fittings. Saddle tanks and engine fittings of locomotive type boilers should be removed for inspection of the parts underneath at the first inspection and at any reasonable period afterwards if the Inspector cannot satisfy himself. If the owner in any special case

thoroughly satisfy himself

11. *Entries in Certificates.*—The Inspector should state in his certificate the load to be placed on the safety valves or the thickness of washers or ferrules required as a safeguard against overloading, the date and pressure of the last hydraulic test of the boiler and, when applicable, of the main steam pipes attached to it.

His remarks should be brief. In the absence of remarks on the boiler's condition the boiler will be considered to be in good condition.

In the remarks column he should state his requirements if any, with regard to hydraulic test, removal of lagging, brickwork or other concealing parts for the next inspection, to enable the owner to have the same properly prepared at that time; but omission of requirements from the certificate is not to deter the Inspector from requiring a hydraulic test or further removal of brickwork or concealing parts, if he considers the same necessary for his inspection. He should also state in the same place his requirements regarding the repair or renewal of any part that may be considered fit only for the period of the certificate.

When the Inspector is unable to grant a certificate he should inform the owner according to the provisions laid down in section 11 of the Act.

The boiler must be tested to the satisfaction of the Inspector.

The boiler must be tested to the satisfaction of the Inspector.

At the first hydraulic test of a boiler prior to careful deflection measurements must be made before furnace length, firebox and flat end or other part thereof details of the test are to be entered in the before its submission to the Chief Inspector.

Every boiler at its first hydraulic test must be entirely cleared of lagging or brickwork. At subsequent hydraulic tests the lagging or brickwork or portions thereof must be removed, if required by the Inspector. Generally, his requirements

in this respect for a future test should be entered in the certificate for the boiler.

After the application of the hydraulic test the Inspector shall, before issuing a provisional order or certificate, carefully examine the boiler inside and outside and satisfy himself that it has satisfactorily withstood the test.

In any case in which the safe working pressure to be allowed for a boiler determined by calculation of the Chief Inspector attaining the fitness of such in such a case must not exceed the test pressure prescribed for the least working pressure found by calculation for other parts of the boiler or the intended working pressure, whichever is less. Should any part of the boiler show undue deflection or indication of permanent set during the progress of the test, the pressure must be released immediately such indications are observed. The working pressure for the part should be one half of the test pressure applied when the point of permanent set was reached. This procedure shall apply to any boiler at any test.

Hydraulic test of boilers at subsequent inspections shall, except when the Inspector expressly requires otherwise, be made after the inspection. The test pressure to be applied to old boilers should be from one and a quarter to one and a half times the working pressure of the boiler.

When the internal construction or size of a boiler will not permit of the Inspector getting inside it or of examining closely all its parts, he shall see it tested by hydraulic pressure to one and a half times the working pressure at each certificate inspection.

Water tube, locomotive type and all tubular boilers must be hydraulically tested at each certificate inspection, unless such test is waived under the orders of the Chief Inspector.

The Inspector may at any inspection, if he considers it necessary, apply a hydraulic test to any boiler.

The hydraulic test of all boilers except in the case of small portable and vehicular boilers not requiring re-erection or building in brickwork, shall be conducted only after the erection of the boiler *in situ* and all boilers shall after re-erection in a position different from that in which they last were examined, be hydraulically tested. An hydraulic test shall also be taken before granting an increased pressure certificate and after repairing a boiler, unless the Chief Inspector authorises the Inspector to waive such test.

When carrying out hydraulic tests Inspectors are to use the pressure gauges supplied by the Department.

13 Steam Tests.—Every newly registered boiler and every other boiler of which the working pressure has been altered shall, before the issue of an original or renewal certificate for such boiler, be tested under steam to the satisfaction of the Inspector.

Due notice of the date fixed for the steam test shall be sent to the owner by the Inspector.

Preparation for Steam Test—A steam test is primarily intended for the purpose of relieving the time the test should

On completion of the safety valve test the Inspector should satisfy himself that the water gauges are in working order and that the feed apparatus is capable of supplying the boiler with sufficient water. He may also when he thinks fit satisfy himself by questioning or practical test whether the person-in-charge of the boiler

understand the use and purpose of the water gauges, the pressure gauge, the safety valves, the feed water supply and blow down, as it is the Inspector's duty under section 13 of the Act to refuse to recommend a certificate for a boiler unless the attendant is, in his opinion, competent to have charge of it.

When witnessing safety valve tests Inspectors are to use the standard pressure gauges supplied by the Department, unless the boiler pressure gauge has since the time of inspection been tested and found correct with the Department's testing machine.

No steam gauge should be used without a syphon filled with water between it and the boiler.

On completion of the test the Inspector shall enter all details in the Memorandum of Inspection Book which shall be submitted to the Chief Inspector for his approval before the issue of a certificate. When the accumulation of pressure at a steam test exceeds ten per cent. of the maximum working pressure, the area of the safety valves must be considered insufficient and a certificate should be refused until the safety valve area is increased.

An Inspector may, when visiting a factory for any purpose, verify the correctness of the safety valves and pressure gauge of any boiler under steam by comparison with his standard pressure gauge.

11. *Repairs to Boilers*—Extensive repairs such as renewal of furnaces, end
his other
note tubes
y should be

The renewed parts should be treated as parts of a new boiler and must comply with the Regulations in force at the time for the intended pressure. Under clause 4 boilers are liable to an hydraulic test after repairs.

15 *Submission of Plans of Boilers*.—In the case of land boilers made in India or outside India for use in British India the Chief Inspector may, on receipt of a Treasury acknowledgment of the prescribed fee, receive for examination plans and particulars of materials, design and construction of boilers before hand so as to avoid questions arising at the examination of the finished boilers.

The Chief Inspector shall after examination of the plans and particulars furnish the proposers with his opinion as to whether he is satisfied with the design and fitness of the parts for the intended pressure or, if not, what modification may be necessary therein. When plans and particulars of boilers have been approved, the Inspector in making his examination shall see that the designs as approved have been carefully followed out and that the material corresponds with the approved particulars.

The above procedure should be followed in the case of extensive repairs or alterations to boilers, but no fee will be charged for the examination of such plans and particulars.

SECTION II.—STEAM PIPES.

1. *Inspection of Steam Pipes*, [prescribed under section 27 (e) and (f) of the Act]—Steam pipes should be inspected and hydraulically tested before erection in

certificate for the steam pipes is to be issued, nor is a separate fee to be charged for their inspection. At subsequent inspections of the boiler or at any other time, the Inspector may make an external inspection of the steam pipes and for this purpose

The date and hydraulic pressure to which steam pipes were subjected shall be entered in the certificate for the boiler and such entries shall be continued from time to time in the renewal certificates for the boiler.

Inspectors shall see that steam pipes are fitted with suitable means of drainage. Pockets or low-lying bends, in which condensed steam is likely to collect, should not be permitted.

Efficient means for draining steam pipes should be provided in every case. Boiler stop valves cannot be regarded as suitable for this purpose. All drain cocks or valves shall be accessible and be so placed as to render it practicable to drain the water from any part of the steam pipes or chests connected with them. Drain pipes should be fitted to drain cocks or valves when the latter are in such a position that the water or steam discharged from them would be likely to cause personal injury.

It is desirable that the drains should be automatic in their action.

Suitable provision should be made for expansion, either by means of large bends

The Inspector
that the end
or movement of

the pipe.

2. *Material*.—The Chief Inspector is authorised to permit the use of cast iron steam pipes in exceptional circumstances as a temporary measure only for such period and subject to such condition as he may prescribe.

3. *Submission of Plans of Steam Pipes*.—Plans of steam pipes shall be submitted to the Chief Inspector before construction or at the time of registration of the boiler for his opinion whether the pipes and their arrangement will comply with the Regulations.



APPENDIX I-C.

Model Administrative Rules framed under Section 28 of the Indian Boilers Act.

ACT of 192 .

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I.—Preliminary.

Definitions

1. In these rules unless there is anything repugnant in the subject or context,—

- (a) "The Act" means the Indian Boilers Act of 192
- (b) "Section" means a section of the said Act.
- (c) "Regulation" means a regulation framed by the Government of India under Section 27 of the said Act.

2. All fees payable under the Act shall be deposited by the payer in a Government

Payment of fees.

Treasury or the Imperial Bank of India. Applications under Sections 8 and 9 of the Act, to which the treasury or bank receipt for payment is affixed, shall be deemed to be accompanied by the prescribed fee.

II.—Duties of the Chief Inspector.

Control by Director of Industries

3. The Chief Inspector shall work under the administrative control of the Director of Industries, and shall submit to him—

- (a) an Annual Report on the administration of the Act,
- (b) such other reports and returns as may be called for.

Exceptional cases which are not covered by the regulations or rules should be reported to the Director of Industries.

4. The Chief Inspector is vested with all the powers of an Inspector under the

Duty of general control

Act. His main duty, however, consists in supervising and controlling the work of the Inspectors, and he should only actually inspect or examine boilers in exceptional cases, or where he considers that the work of an Inspector requires a personal check.

5. The Chief Inspector shall—

Specific duties

- (a) personally check the registration and measurements of all newly registered boilers, for the initial working pressure on the basis of Part I of the Regulations and enter under his own signature all orders required by Section 8;
- (b) enter under his own signature any subsequent entries required in the registration book;
- (c) obtain from the province of registry the registration book of any boiler the transfer of which is reported under Section 7 (b);
- (d) fix the area under the control of each Inspector;
- (e) approve the programme of all inspectors subordinate to him with due regard to the convenience of owners generally;
- (f) examine and countersign the Inspectors' Memorandum of Inspection Book of each boiler after each inspection;
- (g) examine and pass orders on the diaries and return of inspectors;
- (h) pass orders in all cases in which an Inspector proposes to increase or reduce the pressure allowed for any boiler under Section 11, or to revoke, cancel or refuse to renew the certificate of a boiler under Section 13, or to order important repairs, structural alterations, or renewals in a boiler under Section 11,

- (g) pass orders in all cases in which it is reported that after due notice the boiler has not been properly prepared for inspection ;
- (j) decide all appeals against the order of an Inspector under Section 19 ;
- (k) sanction prosecutions under the Act ;
- (l) enquire into serious accidents to boilers.

6. The Chief Inspector shall keep in his office :—

Instr
dix.

7. The Chief Inspector shall keep in his office :—

Registers to be kept.

- (a) a Register in Form A of all boilers registered in the province, or the registry of which has been transferred from another province.
- (b) The Registration Book and Memorandum of Inspection Book of all boilers borne on his register.
- (c) a Register of Appeals.
- (d) a Register of Accidents
- (e) a Register of Registration and Inspection fees received.

8. The Chief Inspector shall be the controlling or countersigning authority in respect of all contingent bills and of travelling allowance bills of officers subordinate to him.

III.—Duties of Inspectors.

9. Inspectors shall be directly subordinate to and under the control of the Chief Inspector; they should ordinarily be appointed to take charge of specific areas.

10. The Inspectors shall be under the inspection of the Chief Inspector. The Inspectors shall be appointed to Part II of the Rules, which must be very closely observed.

11. In addition to the inspection and examination of boilers, it is the duty of Inspectors to search for unregistered or uncertificated boilers within their areas, and to see that certificated boilers are worked in accordance with the terms of their certificates.

12. The Inspectors shall be required in view of the quantity of water used.

13. Inspectors shall —
Specific duties.

- (a) prepare a programme of inspections with regard to the convenience of owners generally and submit it at such periods as may be prescribed, at least 14 days before the first date fixed in the programme, to the Chief Inspector for approval ;

N. B. — Inspection of boilers in seasonal factories should ordinarily be fixed immediately after the date when work in the factory ceases, and in all cases during the off season.

- (b) maintain a Memorandum of Inspection Book for each boiler under their charge and submit it to the Chief Inspector for examination and countersignature after each inspection ;

- (c) keep a diary for weekly submission to the Chief Inspector, showing places visited, boilers registered or inspected with fees paid thereon, variations from the programme and any other important particulars ;
- (d) receive applications for registration or inspection under Sections 8 or 9, proposals for repairs, alterations or renewals under Section 14 and reports of accidents under Section 17 ;
- (e) enquire into accidents to boilers or steam-pipes and report to the Chief Inspector ,
- (f) report to the Chief Inspector cases of unreported accidents discovered at the time of inspection ;
- (g) submit for the orders of the Chief Inspector —
 - (i) the Memorandum of Inspection Books of all boilers proposed for registration under Section 8 ,
 - (ii) proposals for increasing or decreasing the pressure of a boiler after inspection under Section 11 ;
 - (iii) proposals for necessary repairs, structural alterations or renewals to a boiler under Sections 11 or 14 ;
 - (iv) proposals for revoking, cancelling or refusing to renew a certificate under Sections 13 or 11 ;
 - (v) report when boilers have not been properly prepared for inspection under Section 10 ;
 - (vi) proposals for prosecutions under the Act

14 No examination of a boiler shall be made by an Inspector for the purpose of registering or issuing a certificate for a boiler on a Sunday or between the hours of sunset or sunrise without the specific orders of the Chief Inspector in each case. In such cases a double fee may be charged, half of which may be payable to the Inspector.

15 Under orders of the Chief Inspector, Inspectors shall attend during the hearing of appeals with regard to boilers under their charge before the Chief Inspector or the Appellate Authority.

16 Every Inspector shall keep in his office —

Registers to be kept

- (a) a Register in Form A of all registered boilers situated within his jurisdiction ,
- (b) a Register of Accidents ;
- (c) a Register of Registration and Inspection fees received.

IV.—Administrative Instructions for Registration.

17. Technical regulations for the registration of boilers and the scale of fees for registration are prescribed in Part II of the Regulations. The details of measurement recorded at the time of registration constitute a permanent record for the boiler and determine the original pressure at which the boiler is allowed to work. It is accordingly essential that the work should be done with the greatest care and precision

18. Applications for registration shall be made under section 8 (1) either to the Chief Inspector, or to the Inspector of the local area in which the boiler is situated and shall be accompanied under rule 2 by a receipt for the receipt of applications. No boiler shall be deficient, until the defect has been reported at the time of registration.

19. It is essential that no delay should occur in registration. In large towns, the measurements under Section 8 (2) should ordinarily be completed and the report submitted to the Chief Inspector within 7 days of the receipt of the applications; in no cases should the interval exceed 30 days. The Chief Inspector should issue his orders under Section 8 (3) without delay.

20. The Chief Inspector shall maintain a Register of Registered Boilers in serial order in Form A in two parts: in Part I (Boilers originally registered in the province) the registration number of a boiler shall be the one immediately following the last serial number in the Register. Gap numbers due to boilers being broken up or transferred to another province shall not be filled up. In Part II (Boilers originally registered in other provinces) entries shall be made as prescribed in Rule 22. Inspectors shall keep a similar Register for all boilers within their jurisdiction.

21. Whenever a boiler is transferred from one province to another, the owner shall, under Section 7 (4), apply to the Chief Inspector of the province to which the boiler is transferred for the registration of the transfer; the boiler cannot be used until registration has been effected. The Chief Inspector shall then obtain from that province the Registration Book and Memorandum of Inspection Book of the boiler. No fee shall be charged for recording transfers.

22. On receipt of the Registration and Memorandum of Inspection Books, the Chief Inspector shall enter the boiler under its original number in Part II of his Register, and shall instruct the Inspector of the local area in which the boiler is situated to enter it similarly in his Register. The Registration Book and the Memorandum of Inspection Book shall be kept in the Chief Inspector's Office.

23. Whenever a boiler has been transferred or broken up, the fact shall be noted in the Register of the Province from which it has been transferred. In the case of a boiler that has been permanently dismantled the Registration Book and the Memorandum of Inspection Book shall be destroyed.

V.—Administrative Instructions for Inspection.

24. Detailed instructions for the inspection of boilers are contained in Part II of the Regulations. In making inspections it is important that the Inspector should pay particular attention to entries made in the Memorandum of Inspection Book at the time of the previous inspection.

25. In arranging for inspections particular attention should be paid to the provisions of rule 13 (1). The notice required by Section 10 shall be sent in Form B. If an hydraulic test is necessary in addition to the ordinary inspection a special notice must be given to the owner. During the inspection of one of a battery of boilers the Inspector should take the opportunity of examining the other boilers under cover, with special reference to the water valves, pressure valves, and safety valves.

26. In cases in which the Inspector is empowered to issue a certificate under Section 11 without further reference, the certificate should ordinarily be issued within 48 hours of the completion of the inspection. Where he proposes to issue a provisional order, the Inspector must satisfy himself that the boiler is fit to be worked at the maximum pressure and for the period covered in the provisional order. The date of issue of a provisional order must be reported immediately to the Chief Inspector.

27. Provisional orders and certificates shall be issued in Forms C and D respectively.

28. Fees for inspection shall be calculated on the basis of boiler rating, as prescribed in part II, Section I, Clause 5 of the Regulations. The following fees are prescribed :—

VI.—Accidents.

29. On receipt of a report of an accident to a boiler or steam-pipe under Section 17, the Inspector should, with the least possible delay, proceed to the place to investigate the accident. If the report is received by the Chief Inspector, he should forward it at once to the Inspector, within whose jurisdiction the accident has occurred, for necessary action.

30 The Inspector at his enquiry shall make a careful examination of the damaged parts, and shall take such measurements and make such notes as may be necessary. He shall also ascertain the cause of the accident, and the persons immediately concerned with the accident. He shall also ascertain the names of the witnesses, and the names of the persons who were present at the time of the accident. He shall also ascertain the names of the persons who were in charge of the boiler at the time of the accident. He shall also ascertain the names of the persons who were in charge of the boiler at the time of the accident.

31. Inspectors are authorized to take the written statements of witnesses and all persons immediately concerned with the accident. In order to comply with the provisions of Section 17 (2), the Inspector should present to the owner or person in charge of the boiler a series of written questions on all points that are material to the enquiry.

32. The Inspector must decide whether the use of the boiler can be permitted at the same or at a lower pressure without repairs or pending the completion of any repairs or alterations that he may order. In no case should he issue a provisional order or renewal certificate, until his orders have been carried out.

33 The report should be sent without delay to the Chief Inspector; if he considers that the investigation has been sufficient, he will record the facts in his Register of Accidents, and enter a brief account of the accident in the Registration Book, a copy being made in the Memorandum of Inspection Book. If, however, the accident is of a serious nature and in all cases in which an explosion has occurred, the Chief Inspector should after receipt of the Inspector's report, proceed to investigate the accident personally or to move the Local Government to appoint a Commission to enquire into the accident. Reports of such enquiries should be recorded as indicated above.

34. Commissions appointed under the preceding rule should ordinarily consist of the Chief Inspector and one independent person.

35 A brief account of all accidents and their causes should be included in the Chief Inspector's Annual Report.

36 If in the course of an enquiry, the Inspector discovers an accident, but which has not been reported to him, he should report it to the Chief Inspector for action under Section 17.

VII.—Appeals.

Filing of appeal.

37. Every petition of appeal shall be made in writing either in English or in the vernacular and shall bear a Court Fee Stamp.

Presentation of appeal.

38. An appeal may be presented either personally or by registered post to the Chief Inspector.

FORM B.

INDIAN BOILERS ACT, 1921.

Act— of 1921.

Notice for Examination of Boiler under Section 10.

No. — of 192 .

BOILER INSPECTION OFFICE,

Dated — , the — 192 .

To

In reply to your application dated — you are hereby informed that
Boiler Registry No. — at the above named premises will be thoroughly examined
by the Government Inspector on the —
hydraulically tested

To enable the examination to be made, you are required to—

- (a) afford to the Inspector all reasonable facilities for such examination and all such information as may reasonably be required by him,
- (b) arrange that the boiler is properly prepared for examination in the prescribed manner,
- (c) provide in the case of a boiler about to be registered such drawings, specifications and certificates as may be prescribed.

Voucher No. — in acknowledgment of Bank Receipt No —
Treasury
for Rs. — accompanies.

Inspector of Boilers.

(See reverse for preparation required.)

(Reverse of Form B.)

PREPARATION FOR EXAMINATION.

SEE PART II, SECTION I OF THE REGULATIONS.

(A) *Preparation for Thorough Inspection.*

At every inspection of a boiler for the grant or renewal of a certificate, the boiler shall be empty and thoroughly clean in all its parts, all doors of manholes, handholes and sight-holes and cleaning plugs and all caps in the headers and mud-drums of water-tube boilers, all firebars, bearers, front plates, bridge plates, fire-bridges, brick arches, oil fuel burners and mechanical stoker fittings shall be removed. All valves and cocks comprising the boiler mountings must be opened up and taken apart and the valves or cocks ground, where necessary, before the Inspector's visit.

of lagging or brickwork or other required by the Inspector, and for dimensions and weights. All smoke tubes, smokeboxes and external flues must be swept clean.

hot water
either by
or by the
they must
No blank

NOTE—These provisions as to effective disconnection shall extend to every case wherein a person is sent or with the assent of the owner or person in charge goes, into a boiler for any purpose.

(B) *Preparation for Hydraulic Test.*

and shut removed, a pressure pump-hose The boiler should be completely filled with water, care being taken to allow all air to escape and, if possible, a preliminary test not exceeding the working pressure of the boiler should be taken before the Inspector's visit to test the tightness of the joints.

Preparation None Required.—(A), (B).

NOTE.—The last certificate for the boiler should be shown to the inspector.

Counterfoil.

No.

FORM C.

PROVISIONAL ORDER UNDER SECTION 12 OF THE INDIAN BOILERS ACT OF 1921

is hereby permitted to use the _____

Boiler Registry No. _____

made by _____

and bearing Maker's Number _____

at a maximum pressure of _____ lbs.

per square inch pending the issue or refusal of a certificate within six months from the date hereof after which period this order will become void.

Dated _____

Inspector of Boilers.

N. B.—This order must be produced on demand by any authorised person and surrendered to the Chief Inspector on receipt of orders.

FORM D.

BOILER INSPECTION DEPARTMENT.

Certificate Under the Indian Boilers Act of 192 .

Registry No of Boiler _____ Type _____ Boiler Rating _____

Name of Owner _____ Place and year of manufacture _____

Situation of Boiler _____

I hereby certify that the above boiler is permitted by ^{me} the Chief Inspector under

the provisions of Section $\frac{9(1)}{8(3) \text{ or } 9(1)}$ of the Indian Boilers Act _____ of 192

to be worked at a maximum pressure of _____ lbs. to the square inch

for a period of 12 months from _____

to _____

I further certify that the steam-pipe was tested hydraulically to a pressure of

_____ lbs. per square inch last on _____

Inspector.

N.B.—Details regarding this boiler are recorded in Registration Book No _____, of which a copy may be obtained on payment on application to the Chief Inspector

(See reverse for "Conditions".)

Conditions.

(1) No structural alteration or renewal shall be made to the boiler otherwise than in accordance with Section 14 of the Act.

(2) Under the provisions of Section 9 of the Act this certificate shall cease to be in force on the occurrence of any accident as described therein, and the boiler shall not be used until a new certificate has been granted.

(3) The boiler shall not be used at a pressure greater than the pressure entered in the certificate as the maximum pressure nor with the safety valve set to a pressure exceeding such maximum pressure.

(4) The boiler shall not be used otherwise than in a condition which the owner reasonably believes to be compatible with safe working.

APPENDIX.

General working of Boilers. Instructions to Boiler Attendants.

* These instructions should be frequently and carefully studied, with a view to keeping in mind the precautions to be observed, and the ordinary procedure to be followed in the safe working of boilers.

Precautions before starting the fires.

Before starting the fires in a boiler, the attendant should—

- (1) see that there is sufficient water in the boiler and that the gauge cocks are working freely ;
- (2) ease safety valves, or open cock on top of boiler to allow air to escape,
- (3) see that the blow-off cock is fully closed and tight ;
- (4) see that the safety valves and feed check valve are free and workable ;
- (5) see that water is not leaking from any part of the boiler ;
- (6) note if the pressure gauge pointer is at zero ,
- (7) see that the feed pump is in working order

He must not rely on the supposition that the water he has previously put in is still in the boiler, as it may have run out without his knowledge through a leak or open cock, nor can he be sure that the gauge glass shows the true water level until he

as before

should
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ork is
large
ing up
height
free

Steam Pressure.—Ordinarily the safety valve will prevent the steam from rising much above the working pressure, but if the steam gauge shows so rapid an increase of pressure as to indicate danger of exceeding the highest limit, water should be immediately fed into the boiler and the dampers partially closed in order to diminish the effect of the fire. If, however, the water has fallen so low that there is danger of an accident from this cause, the fire should be withdrawn before feeding in water, the safety valves eased, and if the engine is at rest, it should be started so as to reduce the pressure.

The Safety Valves are provided to guard against over-pressure. They should be moved by hand every day so as to prevent them from sticking. If moved only occasionally, they are liable to leak.

The valve can be tested by slowly raising it a little, and when let down, it should close perfectly tight. It should never be opened by a sudden knock or pull. If it does not close tight, turn it on its seat until it fits, or when its construction does not permit this, raise it slowly a few times and let it down again, but on no account must the valve be screwed down further or loaded more than what has been allowed by the Inspector.

Safety valves must never be overloaded, and spring valves should have ferrules or other provisions against their being screwed down too far. In case of an accident resulting from wilful overloading, the culprit might be held criminally responsible at the official enquiry or inquest.

Low Water Safety Valves.—If there is a low water safety valve, test it occasionally by lowering the water level to see that the valve begins to blow at the right point. It should give warning "before" the water level has sunk too low, and before damage can be done. When the boiler is opened, examine the floats and lever and the ordinary at its lowest

The Water Gauges.—These will be kept best in order by frequently blowing through. The cocks are thus kept in good working condition without leaking. Blow through the drain cock at the bottom of the gauge glass frequently when the water is dirty. Show or whenever the water in the gauge glass moves sluggishly, the passages must be cleaned. This is best done with a wire. The gauge glass is so arranged that its top cock connects with the steam space and its bottom cock is below the water line. The water line will ordinarily be near the centre of the glass tube. Always test the

be kept open.

If water and steam do not appear in proper order the cocks are choked and the passages should be cleaned. To lessen the risk of breaking the gauge glass the water cock should always be reopened after the steam cock.

Gauge
on the side
especially

The Government Boiler Regulations require every water gauge glass to be fitted with a guard to prevent injury to the attendants. See that it is always in place, and clean, when there is steam in the boiler.

Special Note.—It does not follow that there is plenty of water in the boiler because there is plenty of water in the gauge glass. The passages may be choked, and empty gauge glasses are sometimes mistaken for full ones, and explosions have resulted therefrom. Hence the importance of keeping the gauge cocks perfectly tight and clean and of blowing through the test cocks frequently.

A large number of accidents have been due to inoperative water gauges, and to negligence of the attendant in not carefully reading the water level.

The Blow-off Cock.—The Blow-off should be used daily if the water is at all dirty or sedimentary, especially with Locomotive type and Vertical Boilers, as their narrow water spaces are liable to get choked with mud, which soon hardens into a solid mass. The amount of water to be blown out depends on the size of the boiler result is started) turn the
cock round.

The Scum Cock.—When scum cocks are fitted, if the feed water is dirty, a little
cock round. Before
by the water-level
be blown from the
when the engine

Manhole and other door joints.—When making such joints, the jointing
it be taken that the
ts have resulted from
when the clearance

was only $\frac{1}{2}$ inch. The nuts must be carefully and evenly tightened. Further tightening should be made during the process of heating up the boiler when raising steam.

Frequently, however, of use, condensed water care should be taken is opened, other- ed steam pipes, and

Scale and grease—Roughly speaking, scale offers a hundred times as much

causes of boiler wear and tear.

Wear and tear.—Can be reduced and the life of a boiler prolonged if scale and grease are prevented from accumulating in a boiler. The combined effect of scale or grease and artificial draught are disastrous. Scale or grease also causes waste of fuel.

Grease.—A mixture of sedimentary water, soda, and grease produces an adhesive scum. Where this is suspected, the water level should never be lowered below the furnace top, unless the boiler is afterwards entered and this scum cleaned off the furnace plate before firing again.

Scale Removal.—The customary method is not a satisfactory one. The boiler is emptied and then cooled down by opening all the manholes, and the result is that the scale, which would otherwise be soft, hardens through contact with the air, and requires laborious chipping off.

and until cool, brush water hose,

If time is a consideration, the cooling can be accelerated by adding cold feed to the hot water in the boiler and slowly running off the cooled water. Another method is to blow off the boiler with the lowest possible pressure (not more than 20 lbs.) and to keep it closed until cold. The scale will then be easily removed.

Treatment of feed water.—Many feed waters require soda or other chemicals to arrest corrosion or to change the nature of the scale.

There is no harmless chemical which will remove scale or sediment when it has once got into the boiler, and the only effective process is to purify the feed water before it enters the boiler. By this means the sediment, and generally, too, the added chemicals, can be deposited in tanks or in filters, and therefore never goes into the boiler. A purifying apparatus ought to be used on three or more boilers are in co- treatment twice as to the best and asce Chemical Laboratory

Special attention is drawn to the not infrequent but very bad practice of allowing

they may become over-heated and collapse

It should be the first care of the Boiler Owner, and the Boiler Attendant to see that the feed water is kept as pure as possible. Impure feed water means additional expense on the upkeep of the boiler.

Preservation of boilers when not in use.—Steam boilers when not in use are liable to deterioration from corrosion, and, unless well cared for and made rust-proof, they may depreciate more rapidly than when in use. They should be thoroughly drained and thoroughly dried and all valves, cocks and openings closed so as to exclude moisture. Another plan is to fill the boiler with water to which about 1½ per cent. caustic soda has been added.

SPECIAL INSTRUCTION FOR BOILER No. _____

This boiler should be opened up and thoroughly cleaned after a period of work which should not exceed _____. A record of such cleanings should be maintained and produced, when required by the Inspector

Dated _____

Inspector of Boilers.

APPENDIX II.

No. A-61

GOVERNMENT OF INDIA

BOARD OF INDUSTRIES AND MUNITIONS.

Simla, the 11th November 1920.

RESOLUTION.

THE Government of India have had for some time under consideration the which at present exist in consequence of the Prime Mover Acts in the different provinces by the Industrial Commission in paragraphs and that "trouble was caused to persons who purchase boilers from other parts of India or desire to employ engineers who hold certificates from other provinces".

of engineers and boiler attendants, the Com- where certification is required, engineers were uent than in those where this is not the case,

acquisition of a training, however imperfect, in the management of steam engines.

3. The other main point considered by the Industrial Commission related to the diversity of standards of local legislation in respect of boilers

Commission

4. These questions were further considered by the conference of Directors of Industries held on 2-12-20 at Simla of boiler

and they recommended
charge of boilers might

5. In the rules which have been drafted by Parliament under section 45-A of the Industrial Disputes Act II, item 26-d), it has been proposed that legislation by the Indian Legislature; and if these rules are accepted by Parliament, no serious difficulty should arise in putting into effect the recommendations of the Industrial Commission, should they be supported by the further enquiry which has been proposed by the conference of the Directors of Industries and is accepted as desirable by the Government of India.

6. The Government of India have, therefore, decided to constitute a committee to enquire into matters discussed in this Resolution, and with the general object of a unification of the acts and regulations relating to the inspection, working and upkeep of boilers in India. The Committee would consist of the following gentlemen:—

President.

Mr. F. D. Ascoli, I.C.S.

Members

Mr. R. P. Adams, O.B.E., A.M.I.E., Chief Inspector of Factories, Bengal.

Mr. D. R. MacIntosh, Chief Inspector of Steam Boilers, Bombay.

7. The terms of reference are as follows:—

- (a) To consider the desirability or otherwise of retaining the law at present in force in certain provinces requiring persons in charge of boilers to possess certificates.
- (b) To consider the possibility of introducing a uniform standard throughout India for steam boilers.
- (c) To consider the possibility of the unification of the laws and working and upkeep of boilers, as they may think suitable for this purpose.

Ordered, that a copy of this Resolution be forwarded to all Local Governments and Administrations, with the request that they may require and that any by the Committee may be complied with.

J. C. B. DRAKE.

Secretary, Board of Industries and Munitions.

No. A.61.

GOVERNMENT OF INDIA.

BOARD OF INDUSTRIES AND MUNITIONS.

Delhi, the 19th November 1920.

RESOLUTION.

In supersession of paragraph 6 of the Government of India, Board of Industries and Munitions, Resolution No. A.61, dated the 11th November 1920, it is notified

" " " "

Ordered, that a copy of this Resolution be forwarded to all Local Governments and Administrations.

Ordered also that a copy of the Resolution be forwarded to all Departments of the
ing, Stationery and Stamps, to the
the Resolution be published in the

J. C. B. DRAKE,

Secretary, Board of Industries and Munitions.

APPENDIX III (a).

BOILER LAWS COMMITTEE.

INSTRUCTIONS TO PERSONS INVITED TO GIVE EVIDENCE BEFORE THE COMMITTEE.

(Answers are not expected to questions except those of which each individual witness or the body or association which he represents has actual knowledge or experience.)

(1) The questions in the accompanying list have been framed in order to cover, so far as practicable, all the points included in the terms of reference.

(2) For convenience of reference, that part of the Report of the Indian Industrial Commission which deals with the administration of the Boiler Acts is reprinted in Appendix A.
*Paragraphs 221 and 222 at pages 144-145 of the Report of the Indian Industrial Commission.

(3) The law and regulations regarding the inspection, working and upkeep of boilers are contained in seven different Acts,* amplified by different sets of rules framed under the Acts. The appointment of certificated engineers, where required, is laid down in the Acts themselves; detailed instructions for the inspection of boilers and for boiler standards are prescribed in rules and regulations. It is accordingly necessary to distinguish between the possibility and advisability of unifying the Acts on the one hand and rules and regulations on the other for the whole of India.
*Bengal Act, III of 1879 (in force also in Bihar and Orissa).
Bombay Act, V of 1917.
Madras Act, III of 1897.
United Provinces Act, III of 1915.
Punjab Act, II of 1902.
Burma Act, II of 1910.
Central Provinces Act, II of 1907.

(4) It is necessary to bear in mind that under the Reform Scheme it is proposed that legislation regarding boilers should rest with the Government of India, while the administration of the Acts should remain with Provincial Governments.

QUESTIONNAIRE.

1. State the nature and extent of the experience that you have had of the boiler law of your province or of other areas.

I.—Certificated Engineers.

2. Is it in your opinion advisable that all persons in charge of boilers, or alternatively all persons in charge of boilers exceeding a specified horse power, should possess certificates? Please state your reasons.

3. Can you state from experience whether accidents to boilers are more frequent in areas where certificated engineers are not by law required? Are boiler engineers in such areas generally less technically qualified than in others?

4. Is there any reason to think that certificated engineers may be necessary in certain areas and not in others? If so, would you leave it to Provincial Governments to decide where they are necessary?

5. (a) If your answer to question 2 is in the affirmative, should a certificate granted in one province be valid in all others? (b) What qualifications would you accept in lieu of the ordinary certificate?

7. Please state your views (if any) on the syllabus for a certificate examination (if required) and on the constitution of the examining bodies.

8. Is it a fact that employers dislike certificated engineers on the ground that they are generally not prepared to do practical work in the engine-house because their retention is compulsory?

9. Is it your opinion that where certificates for boiler engineers are compulsory, the desire for a certificate as a boiler-engineer interferes with the ordinary training of a mechanical engineer? If so, could this be remedied by an alteration in the syllabus for the certificate?

II.—Introduction of a uniform standard.

10. What practical disadvantages can you point to which arise from the adoption of different standards for boilers in different provinces? Have any such instances been brought specifically to notice?

11. Are there in your opinion any technical reasons why different standards should be adopted for different parts of India?

12. Can you point to any practical difficulties in laying down a uniform standard or standards for the whole of India?

13. What criticism have you to offer of the standard prescribed in your province? Are the existing rules or regulations? Please give details for any alteration

you suggest a

since should be
the province

III.—Unification of the law.

Note.—The important differences in the existing Acts may be classified as follows:—

- (a) Extent of application to local areas
- (b) Exclusion of certain classes of boilers
- (c)
- (d)
- (e)
- (f)

III(a)—Extent of local application

17. Are there any reasons (apart from difficulties of inspection) why the Act should not be applicable to boilers wherever situated? If so, would you give Local Governments power to exclude areas by notification, or should the power be exercised by the Government of India?

18. What areas in your province are at present excluded from the operation of the existing Act and for what reasons?

III(b).—Exclusion of certain classes of boilers.

19. What classes of boilers in your province are excluded from the operation of the existing Act (a) absolutely by the Act itself, (b) by rules made under the Act? Is

their exclusion suitable? If not, what classes of boilers should be absolutely excluded, and what classes liable to exclusion by rules or notifications under the Act.

20. Would the same principle as regards exclusion apply to both of the above classes throughout India? Should the power to exclude in either case rest with the Government of India or with the Provincial Government?

III (c).—Inclusion of prime-movers and other classes of machinery.

22. Please state to what extent the present Act is applied in the inspection of prime-movers or other classes of machinery. Is this inspection efficacious or necessary?

23. Having regard to section 18 of the Indian Factories Act (XII of 1911), do you think that any necessity exists for similar safeguards in establishments that do not come within the operation of the Factories Act?

III (d).—Appointment and control of inspecting staff.

24. What is the present constitution of the Boiler Inspecting Staff in your province? Are the appointments made by Government or by some other body? Under whose control does the staff work?

25. If the Act be extended to the whole of your province, and not only to notified areas, what increase, if any, in the inspecting staff would be necessary?

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29. If the Act be extended to the whole of a province and not only to notified areas, would the control of a Boiler Commission for each province be effective?

the administration of the
rules for inspec-
ules to be framed

III (e).—Appellate authorities.

31. Describe the system of appeal and the constitution of the appellate authority at present in force in your province. Is the system satisfactory, or what alterations would you suggest?

32. In view of the fact that appeals are concerned with technical matters is it your opinion that the appellate authority or the assessors (if any) or both should be experts?

33. Would a single appellate authority suffice for the whole of your province?

34. Is there in your opinion any reason for the constitution of appellate bodies of different types (a) in different provinces, (b) in different parts of your province?

THE ADMINISTRATION OF THE BOILER AND PRIME-MOVER ACTS.

221. With reference to the Administration of the various provincial Boiler and Prime-Mover Acts, there is a great diversity of practice all over India, which causes trouble to persons who purchase boilers from other parts of India or desire to employ engineers who hold certificates from other provinces. We have enquired closely into the question of the certification of engineers and boiler attendants. We do not find that in provinces where certification is required, engineers are better qualified or accidents less frequent than in those where this is not the case. It is urged that

undoubtedly the case that the possession of a certificate gives a fictitious value to its holder, and makes it more expensive to employ him on small installations. It is true that certain educational institutions owe many of their pupils to the fact that they prepare them for boiler certificate examinations, but this is beside the point. The demand for qualified engineers is greatly on the increase, and a better class of man than the mere "engine driver" must be provided for the larger organised industries.

Accidents are usually due either to carelessness, or to defects in the plant. When due to ignorance, which is seldom, they are likely to occur during the absence of the responsible attendant, a possibility that is at least as great in provinces which insist on certificates as in those which do not. It must also be remembered that at present the law does not apply to the case of internal combustion engines, which are not less liable to accidents in their way than steam engines.

222. The Boiler Inspection Department is considered at length in the report of the Public Services Commission (page 126). The Commissioners lay down four principles for general guidance.—

"In the first place, the time has come to make the boiler inspectors Government servants in every respect. The system of appointing them from general revenues both their salary and the amount of fees earned. Secondly, the amount of fees is essential. Police

according as the work to be done is on a large or small scale.

We endorse these recommendations, and would add the following —

- (1) Boiler inspection should be a duty of the provincial Departments of Industries
- (2) The technical which maintain types of boilers
- (3) The laws compelling persons in charge of boilers to possess certificates should be abolished

The second and third of these proposals would involve legislation.

APPENDIX III (b).

Additional Technical Questionnaire.

It is proposed to formulate a set of rules for the material, design and construction of land boilers for the whole of India and the Committee would be glad to have your opinion on the following points :—

Standard Regulations.

1 (a) Should the standard conditions to be laid down in the rules for material design and construction of the various parts constituting a boiler (based on the latest Board of Trade Rules and on the recommendations of the British Marine Engineering Design and Construction Committee) be adhered to by the Boiler Inspection Department with the standard rules in force at present or on the basis of an inspection of an existing boiler indicates at a lower

Steam-pipes.

should
interv
period
test i.
of steam-pipes? (g) Should cast iron as material for steam-pipes be prohibited for future main steam-pipe installations? (h) Should the date of hydraulic test and pressure to which steam-pipes were subjected be shown in the boiler certificate? (i) Do you consider that provision should be made in the rules for the effective disconnection of steam and hot water communication with another boiler during inspection or at any time when a person has to go inside? (j) If so, what in your opinion would be effective disconnection?

Safety Valve.

- (a) Should there be more than one safety valve on a boiler?
- (b) If so, should one be a lock up valve?
- (c) What in your opinion should be the minimum diameter of safety valve?
- (d) If two safety valves are desirable, would you agree to them being in one chest?
- (e) Should a tee piece or distance piece be allowed between the safety valve chest and the boiler?
- (f) Would you consider a safety valve chest to which the main stop valve is bolted a satisfactory arrangement?

(a) In the case of some lightweight tanks having the engine on top, it is the boiler itself.

Μαθητές.

(a) Should a manhole in the barrel of a locomotive type boiler be required by the rules?

and females 49,609; occupying 16,869 houses, in 3 towns and 110 villages. Hindus number 74,736; Muhammadans, 7036; and 'others,' 26,377. Along the centre of the island, from north to south, runs a broad range of hills, which after subsiding into the plain near Kurla, crops up again in the southernmost point of the island at Trombay. The central and highest, Thána peak, is 1530 feet above sea level; on the north is a detached, sharp peak, 1500 feet high. Spurs from the main range run west towards the sea, while the low lands are much intersected by tidal creeks, which especially on the north west split the sea face of the Sub-division into small islands. There are no large fresh-water streams; but the supply of water from wells is of fair quality, and pretty constant. The staple crop is rice, and most of the uplands are reserved for grass for the Bombay market. The coast abounds in cocoa nut groves, and the palmyra palm grows plentifully over most of the island. This beautiful island is rich in rice-fields, diversified by jungles and studded with hills. The ruins of Portuguese churches, convents, and villas attest its former importance, and its antiquities at Keneri still form a subject of interest. Eighteen estates, consisting of 53 villages, were granted in Salsette by the East India Company; some freehold, and others on payment of rent, and liable to assessment. The lines of the Great Indian Peninsula Railway, and of the Bombay, Baroda, and Central India Railway, traverse the Sub-division.

Seized by the Portuguese early in the 16th century, Salsette should have passed to the English, together with Bombay Island, as part of the marriage portion of the queen of Charles II. The Portuguese in 1662, however, contested its alleged transfer under the marriage treaty, and it was not till more than a century afterwards that possession was obtained. The Maráthás took it from the declining Portuguese in 1739. The English captured it from the Maráthás in December 1774, and it was formally annexed to the East India Company's dominions in 1782 by the treaty of Salbái.

Salsette affords a deeply interesting field for the geologist and natural historian, and it occupies several paragraphs in the official *Manual of the Geology of India*. It will ever be associated with the name of Victor Jacquemont, as it formed the scene of his last labours; and from its jungles the brilliant Frenchman carried away the fever of which he shortly afterwards died at Bombay.

The cave architecture of Salsette deserves notice. The great *chaitya* at Keneri, however, is pronounced by Fergusson to be merely a bad copy of the Karli cave. It belongs to the beginning of the 5th century, but nine of its *viháras* seem to be of earlier date. Salsette had, however, a sanctity of its own early in the 4th century as containing a tooth of Buddha; at the period, says Fergusson, 'when these relics were revolu-

tionizing the Buddhist world—at least at two diametrically opposite points of the coast of India, at Purī, and in this island. It may have been in consequence of the visit of this relic that the island became holy; and it may have been because it was an island that it remained undisturbed by the troubles of the mainland, and that the practice of excavating caves lasted longer here than in any series above described. Be this as it may, the caves here go straggling on till they fade by almost imperceptible degrees into those of the Hindu religion. The Hindu caves of Montpezir, Kanduti, and Amboli are so like them, and the change takes place so gradually, that it is sometimes difficult to draw the line between the two religions.

Of the total area of 241 square miles, 37 square miles are occupied by lands of alienated villages. In 1879–80, the holdings numbered 8808, with an average area of $6\frac{1}{2}$ acres, paying an average Government assessment of £1, 12s. 3d. In 1880–81, 23,243 acres were under actual cultivation, of which 234 acres were twice cropped. Cereals and millets occupied 22,094 acres, of which 21,952 acres were under rice. In 1884, the Sub-division contained 4 civil and 9 criminal courts; police circles (*thánás*), 2; regular police, 197 men, inclusive of police at head-quarters. Land revenue (1883), £14,723. The average annual rainfall for the thirteen years ending 1881 was 97·6 inches. Head-quarters at THANA.

Salt Range.—Hill system in Jehlam (Jhelum), Sháhpur, and Bannu (Bunnoo) Districts, Punjab, deriving its name from its extensive deposits of rock-salt. Lat. $32^{\circ} 41'$ to $32^{\circ} 56' N$, and long. $71^{\circ} 42'$ to $73^{\circ} E$. The main chain commences in the lofty hill of Chel, 3701 feet above the sea, which is formed by the convergence of three spurs cropping up from the Jehlam river, and divided from the Himálayan outliers only by the intervening river valley. The most northern of these spurs rises abruptly from the river bank at Sultánpur, and runs nearly parallel with the Jehlam at a distance of 25 miles, till it joins the main chain after a course of 40 miles. It bears the local name of the Nñi Hills. The second spur, known as the Rotás range, runs half-way between the Nñi Hills and the river, parallel with both. It contains the famous fort of Rotás, and the hill of Tilla, the sanitarium of Jehlam District, with an elevation of 3242 feet above sea-level. The third or Pabbi spur rises south of the Jehlam river, dips for a while on approaching the river valley, and rises once more on the northern bank, till it finally unites with the two other chains in the central peak of Chel. Thence the united range runs westward in two parallel ridges, till it culminates in the mountain of Sakeswar, in Sháhpur District, which has an elevation of 5010 feet above sea-level. Between these lines of hills, and topped by their highest summits, lies an elevated and fertile table-land, picturesquely intersected by ravines and peaks. In

its midst nestles the beautiful lake of Kallar Kahár. The streams which take their rise in the table land, however, become brackish before reaching the lowlands.

The beds of salt, from which the range derives its name, occur in the shape of solid rock on the slopes of this table-land, and form the largest known deposits in the world. The mineral is quarried at the MAYO MINES, in the neighbourhood of the village of Kheura, a few miles north-east of Pind Dadan Khán, in Jhelam District; at WARCHA in Sháhpur, and at KALABAGH in Bannu District. The great bulk of the salt is excavated from the Mayo Mines, which, during the 35 years ending 1883-84, have yielded a total outturn of 40,712,943 *maunds*, or about 18,750 tons, paying a Government revenue in the shape of duty of £8,103,984. The supply is practically inexhaustible. In 1883-84, of an entire out-turn of 1,605,671 *maunds*, or 57,886 tons, from the Salt Range, 1,332,064 *maunds*, or 48,763 tons, were from the Mayo Mines. The total receipts in the shape of duty in 1883-84, from the Mayo, Warcha, and Kalabagh mines, amounted to £330,832, and the charges to £27,879, leaving a net revenue of £302,953. The construction of a permanent bridge across the Jhelam river at or near Pind Dadan Khán, in place of the present bridge of boats, now under the consideration of Government, will bring the Mayo Mines into direct railway communication with the rest of India, and avoid the delay and loss at present caused by transhipment.

Coal also occurs in the Salt Range both in oolitic and tertiary strata; the former at Kalabagh, employed as a fuel for the Indus steamers, and the latter between Jalálpur and Pind Dadan Khán. It is of inferior quality, however, consisting of a brown lignite, difficult to set on fire, and yielding a very large proportion of ash.

From Jhelam District, the Salt Range stretches into Sháhpur and Bannu. The long spur which projects into Sháhpur terminates in the hill of Sakeswar, and comprises a number of separate rock-bound alluvial basins, the largest of which, the Sún and Khabbakki valleys, occupy the northern half, while the south consists of a broken country, cut up into tiny glens and ravines by a network of limestone ridges and connecting spurs. In the northern portion of the range, the drainage gathers into small lakes, and trees stud the face of the country; but southward, the streams flow through barren and stony gorges, interspersed with detached masses of rock, and covered with the stunted alkaline plants which grow on soil impregnated with salt. The Bannu portion of the range runs north-westward towards the Indus, which it meets at Mári, opposite KALABAGH, and rising again on the western side, is continued in the KHATTAK-MAIDANI HILLS. The scenery throughout the Range is rugged and often sublime, but wanting in softness and beauty. In many parts it becomes simply barren and

uninviting. Besides salt and coal, many other valuable minerals occur in these hills.

Salt-Water Lake (or *Dhápá*).—Lake in the District of the Twenty-four Parganás, Bengal; situated about 5 miles east of Calcutta, between the Huglí and Bidyádhari rivers, and covering an area of about 30 square miles. Lat. $22^{\circ} 28'$ to $22^{\circ} 36'$ N., and long. $88^{\circ} 25' 30''$ to $88^{\circ} 30' 30''$ E. It contains a section of the Inner Sundarbans Passage for boats bound to Calcutta *via* Bálágháta. The neighbourhood of the Salt-Water Lake is intersected by innumerable watercourses and rivers, which flood the country at spring-tides. A part of the lake is now in course of reclamation, by the sewage of Calcutta being deposited in it.

Salumbar.—Town in the State of Udaipur (Oodeypore), Rájputána; situated 30 miles south of Udaipur town. Population (1881) 5574, namely, Hindus 4831, and Muhammadans 743. The residence of the most powerful of the feudatories of the State, the head of the Chandáwat clan of Rájputs. Salumbar gives its name to an estate comprising 109 villages. A masonry wall surrounds the town, which is protected on the north by lofty and picturesque hills, one of which, immediately overlooking it, is surmounted by a fort and outworks still in good repair. An artificial lake, overlooked by the chief's palace, lies to the west of the town.

Sálúr.—*Táluk* or Sub-division and *zamlndári*, Vizagapatam District, Madras Presidency. Area, 64 square miles. Population (1881) 80,466, namely, males 39,756, and females 40,710. Hindus number 79,701; Muhammadans, 727; Christians, 3; and 'others,' 35. Number of houses, 17,255; villages, 155. The *zamlndár* was originally feudatory to Jaipur (Jeypore), and afterwards to Vizianagram. The last-named confiscated the *zamlndári* in 1774, but the Company restored it to the old family twenty years later. The *zamlndár* pays a *peshkash* or fixed revenue of £3599; total rental, £11,588.

Sálúr.—Chief town of Sálúr *táluk* and *zamlndári*, Vizagapatam District, Madras Presidency. Lat. $18^{\circ} 30' 40''$ N., long. $83^{\circ} 14' 50''$ E. Population (1881) 11,856, namely, males 5746, and females 6110. Hindus number 11,426; Muhammadans, 425; Christians, 3; and 'others,' 2. Number of houses, 2564. Sálúr is the residence of the *zamlndár*. Sub-magistrate's court, post-office, dispensary, and good school.

Salw (or *Salween*).—River of Burma, with a general north and south course. The source of this river has never been explored; but the authorities agree in stating that it is in proximity to the source of the Irawadí (Irrawaddy), far up in the snowy range which lies eastward of Assam in lat. 28° N., and forms part of the Hii layan system of mountains. After traversing Yunan,

a Chinese Province, and the Shan and Karen States lying south of it, the Salwin enters Lower Burma at its extreme north-eastern corner, and for some distance, as far as the Thaung-yin river, marks the eastern limits of the Province. In this part of its course, the Salwin is a broad, swift stream, navigable by boats, and flowing between high, densely wooded mountains. Farther south, these gorges become narrower; and near the mouth of the Thaung-yin, the breadth of the stream contracts so much that at places its bed does not occupy more than 30 yards.

A few miles lower down, and about 100 miles from the sea, are the great rapids, formed by a bar of rocks stretching completely across the river, and impassable even by canoes during the dry season. In the rains, when the Salwin is swollen by the vast volume of water brought down from the extensive tract of country which it and its tributaries drain, the current is so strong, and the violence of its efforts to pass the rocky ledge so great, that even massive logs of timber are dashed to pieces. Farther south are other but less formidable rapids, impassable in the rains. Below, there are numerous islands and shoals covered during the floods, when the water rises 30 feet. A few miles lower down, after the Salwin has received the Yun-za-lin from the west, the hills on the eastern bank recede, and those on the western diminish considerably in altitude; and the river traverses a more open and level country, with outcrops of limestone on both banks, rising abruptly out of the plain into lofty serrated ridges.

At Maulmain, the Salwin receives from the eastward the GYAING, formed by the junction of the Hlaing-bwe and the Haung-tharaw, and the ATTARAN, which joins the Gyaing at its mouth. Here the Salwin splits into two mouths—the northern, flowing between Bi-lú-gywin and the old town of Martaban, is unnavigable now by reason of sandbanks, but some centuries ago was the principal entrance. The southern branch flows past Maulmain, and falls into the sea at Amherst by a mouth 7 miles wide. By this channel vessels of the largest size can reach Maulmain, but navigation is rendered difficult by the shifting of the sands.

Vast quantities of teak from British and foreign forests are annually floated down the Salwin, and shipped at Maulmain for export. The timber is dragged into the forest streams by elephants, marked, and then washed in the rains into the Salwin, by which it is carried down in whirling masses until checked by a rope stretched across the river at Kyo-dan, about 56 miles above Maulmain. Large numbers of salvors assemble here in the season, and raft as many logs as they can, to be claimed by the owners, who pay salvage.

The area of the Salwin basin is 62,700 square miles; it is 800 miles in length, but seldom more than 100 miles in breadth. The upper part

uninviting. Besides salt and coal, many other valuable minerals occur in these hills.

Salt-Water Lake (or *Dhāpā*).—Lake in the District of the Twenty-four Parganās, Bengal; situated about 5 miles east of Calcutta, between the Huglī and Bidyādhari rivers, and covering an area of about 30 square miles. Lat. $22^{\circ} 28'$ to $22^{\circ} 36'$ N., and long. $88^{\circ} 25' 30''$ to $88^{\circ} 30' 30''$ E. It contains a section of the Inner Sundarbans Passage for boats bound to Calcutta via Bāliāghāta. The neighbourhood of the Salt-Water Lake is intersected by innumerable watercourses and rivers, which flood the country at spring-tides. A part of the lake is now in course of reclamation, by the sewage of Calcutta being deposited in it.

Salumbar.—Town in the State of Udaipur (Oodeypore), Rājputāna; situated 30 miles south of Udaipur town. Population (1881) 5574, namely, Hindus 4831, and Muhammadans 743. The residence of the most powerful of the feudatories of the State, the head of the Chandāwat clan of Rājputs. Salumbar gives its name to an estate comprising 109 villages. A masonry wall surrounds the town, which is protected on the north by lofty and picturesque hills, one of which, immediately overlooking it, is surmounted by a fort and outworks still in good repair. An artificial lake, overlooked by the chief's palace, lies to the west of the town.

Sālūr.—*Tāluk* or Sub-division and *zamīndāri*, Vizagapatam District, Madras Presidency. Area, 64 square miles. Population (1881) 80,466, namely, males 39,756, and females 40,710. Hindus number 79,701; Muhammadans, 727; Christians, 3; and 'others,' 35. Number of houses, 17,255; villages, 155. The *zamīndār* was originally feudatory to Jaipur (Jeypore), and afterwards to Vizianagram. The last-named confiscated the *zamīndāri* in 1774, but the Company restored it to the old family twenty years later. The *zamīndār* pays a *peshkash* or fixed revenue of £3599; total rental, £11,588.

Sālūr.—Chief town of Sālūr *tāluk* and *zamīndāri*, Vizagapatam District, Madras Presidency. Lat. $18^{\circ} 30' 40''$ N., long. $83^{\circ} 14' 50''$ E. Population (1881) 11,856, namely, males 5746, and females 6110. Hind is number 11,426; Muhammadans, 425; Christians, 3; and 'other s,' 2. Number of houses, 2564. Sālūr is the residence of the *zamīn fr.* Sub-magistrate's court, post-office, dispensary, and good school.

Salwīn (*Salween*).—River of Burma, with a general north and south course. The source of this river has never been explored; but the best authorities agree in stating that it is in proximity to the source of the Irawadi (Irrawaddy), far up in the snowy range which lies eastward of Assam in lat. 28° N., and forms part of the Hii layan system of mountains. After traversing Yunan,

a Chinese Province, and the Shan and Karen ni States lying south of it, the Salwin enters Lower Burma at its extreme north-eastern corner, and for some distance, as far as the Thauing-yin river, marks the eastern limits of the Province. In this part of its course, the Salwin is a broad, swift stream, navigable by boats, and flowing between high, densely wooded mountains. Farther south, these gorges become narrower; and near the mouth of the Thauing-yin, the breadth of the stream contracts so much that at places its bed does not occupy more than 30 yards.

A few miles lower down, and about 100 miles from the sea, are the great rapids, formed by a bar of rocks stretching completely across the river, and impassable even by canoes during the dry season. In the rains, when the Salwin is swollen by the vast volume of water brought down from the extensive tract of country which it and its tributaries drain, the current is so strong, and the violence of its efforts to pass the rocky ledge so great, that even massive logs of timber are dashed to pieces. Farther south are other but less formidable rapids, impassable in the rains. Below, there are numerous islands and shoals covered during the floods, when the water rises 30 feet. A few miles lower down, after the Salwin has received the Yun-zu-lin from the west, the hills on the eastern bank recede, and those on the western diminish considerably in altitude; and the river traverses a more open and level country, with outcrops of limestone on both banks, rising abruptly out of the plain into lofty serrated ridges.

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The area of the Salwin basin is 62,700 square miles; it is 800 miles in length, but seldom more than 100 miles in breadth. The upper part

is continuous on the east with that of the Me-kong or Cambodia river; lower down, it is bounded by the Meinam river, which belongs to Siam. The length of the main stream of the Salwin is estimated at 750 miles.

Salwin Hill Tracts.—British District in Tenasserim Division, Lower Burma; extending from the northern frontier southwards to Kaw-ka-rit on the Salwin river, and occupying the whole of the country between that river on the east and the Paung-laung Mountains on the west. On the north it is bounded by Karen-ri (Kareng-nee), on the east by Zin-me, on the south by Amherst and Shwe-gyin, and on the west by Shwe-gyin and Taung-ngu (Toung-ngoo). Estimated area, 4646 square miles. Population (1881) 30,009 souls. From the annexation of Pegu until 1872, the Hill Tracts formed a Sub-division of Shwe-gyin District, but in that year they were erected into a separate jurisdiction. The administrative head-quarters are at PA-PUN.

Physical Aspects.—The whole country is a wilderness of mountains. Even the valley of the Yun-za-lin, the principal river after the Salwin, is, strictly speaking, only a long winding gorge. The direction of the mountains, of which there are three principal ranges, is generally north-north-west and south-south-east, but the spurs from the main system appear to be thrown in bewildering eccentric masses. The slopes are so precipitous, and so densely wooded, that the passage by laden animals is in many places impossible, and that of travellers on foot difficult and fatiguing in the extreme. It is through these hills that Shan caravans come down annually to Rangoon and Maulmain; and with the exception of the routes used by them, there are no roads over which laden bullocks can pass, baggage being carried on men's shoulders.

The country is drained by three principal rivers—the SALWIN, the YUN-ZA-LIN, and the BI-LIN—fed by numerous mountain torrents rushing down narrow ravines, over rocks and boulders, on their way to the larger streams, which partake of the nature of their impetuous tributaries, and dash themselves in foam over masses of rock, or whirl in wild eddies through ravines shut in by beetling crags and gigantic forest trees, covered with brilliant flowers or creepers. When these rivers emerge into the low country they entirely lose their picturesqueness, and sink into muddy streams, with no trace left of their former state but the rapidity of their currents. The Yun-za-lin is navigable in the dry season as far as Pa-pun. Within the limits of this District, the Bi-lin is impracticable, except for rafts and small boats. The Salwin is impeded by impassable rapids.

In the mountainous region the soil is reddish clay. Outcrops of gneiss shale are met with in places, also indurated sandstone. Limestone occurs in isolated cavernous hills and along the Livchlok range,

where it contains large quantities of rich galena. A lead mine has been opened on the Livehlok, the working of which had not, up to 1882-83, been regularly commenced. The valley of Yun-zu-lin is extensive, and contains vast quantities of valuable timber. The soil is rich loam in parts, and nearer the river it appears to be alluvial clay and very fertile. Great facilities exist for irrigating the land in this valley, as perennial streams flow down at right angles to the river at short intervals.

The population in 1872 was returned at 26,117, in 1877, at 26,649; and in 1881, at 30,009, namely, males 15,509, and females 14,500. Number of villages, 209; occupied houses, 6387; unoccupied houses, 57. Average density of population, 6.46 persons per square mile. Classified according to age, there were—under 15 years, boys 6497, and girls 6007; total children, 12,504, or 41.7 per cent. of the population: 15 years and upwards, males 9512, and females 8493; total adults, 17,505, or 58.3 per cent.

According to religion, the population was thus distributed in 1881—Buddhists, 5100; Nat-worshippers, or persons of indigenous religion, 24,738; Hindus, 35; Muhammadans, 105; and Christians, 31. By race, the inhabitants are almost entirely Karens; a few Shans are settled in the neighbourhood of Pa-pun. The eastern portion of the Hill Tracts was formerly inhabited by Yun Shans, whence the name Yun-zu-lin; but the majority of these were carried away by Alaungpaya to what is now the Syriam township of Pegu.

Salwin District contains no town. The head-quarters station, PA-PUN, contains less than a thousand inhabitants. The remaining villages, 208 in number, are small, and of no importance; 158, or 75.6 per cent., contain less than two hundred inhabitants; 46 between two and five hundred; and 4 between five hundred and one thousand.

Agriculture.—Of the total area of 4646 square miles, only 21 square miles were returned in 1883-84 as under cultivation, and 3116 as cultivable waste. The chief crops are rice and areca nuts. In 1883-84, 437 acres were under rice (excluding the *taungyas*), 1524 acres under areca-nuts, and 34 acres under mixed fruit-trees. The cultivation is almost entirely carried on in *taungyas* or nomadic clearings in the hills, except near Pa-pun, and in the areca-nut groves, which are permanent. Area (1883-84) under *taungya* cultivation, 11,270 acres; total area under actual cultivation, 13,265 acres.

The revenue is raised almost entirely from the land and capitation taxes, and amounted in 1883-84 to £1964, of which £940 was land revenue. Area of reserved forests, 70 square miles. The education of the District is carried on by the Buddhist priests. Dispensary at the head-quarters station Pa-pun; number of patients treated (1883-84), 2814. Rainfall (1883), 127.19 inches.

Administration.—The District is administered by a Commissioner, stationed at Pa-pun, on the Yun-za-lin. Under him are an extra-Assistant Commissioner and the *thúgyí* of the six circles of Pa-pun, Kaw-lú-do, Kaw-ka-rit, Ka-daing-ti, Me-waing, and Win-pyaing. The District in 1883–84 contained 2 civil and 2 criminal courts. The average distance of each village from the nearest court is 25 miles. For some years after the country became British territory, it was in a very unsettled state, but the risings were speedily quelled. In 1867, fresh and more serious disturbances broke out. A chief named Dápa attacked and plundered the villages, and threatened Pa-pun; and from that time dacoities or gang robberies became frequent. This District forms the basis of operations of those who have purchased the right to fell timber in the vast teak tracts beyond the Salwín river. These foresters come up with large sums in cash, which they require for the payment of their workmen, or for dues to the various chiefs; and in consequence, the whole of the neighbouring country beyond the borders has become the haunt of men who acknowledge no fixed authority, but collect in bodies under some daring leader, fall upon the foresters, and attack the villages of the District. In order to remedy this, the Salwín Hill Tracts were separated from Shwe-gyin in 1872, and formed into a distinct administration, and the police were considerably strengthened. The Commissioner of the District is *ex officio* Superintendent of Police, and in 1883–84 had a force under him of 19 subordinate officers and 232 men, of whom 12 were river police; of these, 156 were Karens, who work well but will not serve for long. The constabulary is quartered at Kaw-lú-do, at Kyauk-nyat, and Da-kwin on the Salwín, with a strong reserve at Pa-pun. [For further information regarding the Salwín Hill Tracts, see the *British Burma Gazetteer*, 2 vols., compiled by authority (Rangoon Government Press, 1879 and 1880); the *British Burma Census Report* for 1881; and the several annual Administration and Departmental Reports of the Government of Burma.]

Samadhiála.—Petty State in the Gohelwár division of Káthiáwár, Bombay Presidency; consisting of 1 village with 2 separate tribute-payers or shareholders. Area, 1 square mile. Population (1881) 957. Estimated revenue, £800; £51 is paid as tribute to the Gáekwár of Baroda, and 16s. to the Nawáb of Junágarh.

Samadhiála Chabhária.—Petty State in the Gohelwár division of Káthiáwár, Bombay Presidency; consisting of 2 villages, with 5 separate tribute-payers or shareholders. Area, 62 square miles. Population (1881) of the State, 1414; and of Samadhiála Chabhária village, 689. Estimated revenue, £650; £189, 2s. is paid as tribute to the Gáekwár of Baroda, and £38, 18s. to the Nawáb of Junágarh.

Samadhiála Cháran.—Petty State in the Gohelwár division of Káthiáwár, Bombay Presidency; consisting of 1 village, with

2 separate tribute-payers or shareholders. Area, 6 square miles. Population (1881) 135. Estimated revenue, £80; no tribute is paid.

Samadhpur.—Village in Khutáhan *tahsil*, Jaunpur District, North-Western Provinces; situated in lat. $26^{\circ} 3' 55''$ N., long. $82^{\circ} 31' 3''$ E. Population (1881) 2020, chiefly Muhammadans. The village was originally called Bánsipurwa, owing to its site being covered with bamboos; subsequently named Samadhpur from Samadh Páik, the ancestor of the present *samindár*, by whom the village was peopled. Bi-weekly markets on Tuesdays and Fridays.

Sámaguting.—Frontier outpost station and former head-quarters of the Nágá Hills District, Assam; situated in lat. $25^{\circ} 45' 30''$ N., and long. $93^{\circ} 46'$ E., on a tributary of the Dhaneswari (Dhansiri) river, 2477 feet above sea-level, about 67 miles south of Golághát in Sibságar District. Sámaguting was chosen as a British station in 1867, but abandoned in favour of Kohima in 1878, as being better situated for the supervision of the Nágás; the site more healthy; the water-supply secured by an aqueduct; and the garrison strongly stockaded. The country round Sámaguting is inhabited by the Káchá tribe of Nágás. Rainfall, 63 inches.

Sámalkot.—Town in Cocanáda *taluk*, Godávarí District, Madras Presidency.—See CHAMARLAKOTA.

Sámarkha.—Town in Kaira District, Bombay Presidency. Lat. $22^{\circ} 36'$ N., long. $73^{\circ} 2'$ E. Population, including numerous hamlets (1872), 5231; not separately returned in the Census Report of 1881.

Sambalpur.—British District in the Chief Commissionership of the Central Provinces, lying between $21^{\circ} 2'$ and $21^{\circ} 57'$ N. lat., and between $83^{\circ} 16'$ and $84^{\circ} 21'$ E. long. Area (exclusive of the petty Native States attached to the District), 4521 square miles. Population in 1881, 693,499 souls. The seven attached Native States of KAROND or KALAHANDI, RAIGARH, SURANGARH, PATNA, SONPUR, RAIRAKHOL, and BAMRA (all of which see separately) have a total area of 11,897 square miles, and a population of 960,461 souls. Total area of British District and Feudatory States, 16,418 square miles; total population, 1,653,960 souls. Inclusive of the attached States, Sambalpur is bounded on the north by Chutiá Nágpur; on the east and south by Cuttack District, Bengal; and on the west by Biláspur and Raipur Districts. It is the easternmost District of the Chhatísgarh Division. The administrative head-quarters are at SAMBALPUR TOWN.

Physical Aspects.—Though included in the Chhatísgarh Division, Sambalpur forms no part of Chhatísgarh proper, either geographically or historically. The *khálsa* or Government portion of the District lies along the valley of the Mahánadi, and constitutes a centre round which are clustered the feudatory States and chiefships of BAMRA, KAROND,

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PATNA, RAIGARH, RAIRAKHOL, SARANGARH, and SONPUR, which are noticed in their respective alphabetical places. This tract spreads out in an undulating plain, with ranges of rugged hills rising in every direction. The largest of these is the Bará Pahár, a mountain chain which covers 350 square miles, and attains at Debrigarh a height of 2267 feet above the plain. The main portion of this network of hills is situated in a bend of the Mahánadi, by which river it is almost surrounded on three sides, but to the south-west an outlying ridge projects about 30 miles, as far as Singhora *ghát* or Pass, where the road from Ráipur to Sambalpur winds through it. From this point the hills continue in a southerly direction through Phuljhar, when they turn off abruptly to the westward. Singhora Pass has been the scene of many an action between the predatory Gonds of Phuljhar and their more civilised assailants from the Chhatisgarh country; and in 1857, our troops under Captain Wood, under Major Shakespear, and under Lieut. Rybot, had successively to fight their way through, when marching to the relief of Sambalpur. Another important range is that of Jarghāti, which crosses the Chutia Nágpur road 20 miles north of Sambalpur town. This also afforded a stronghold to the rebels. Its highest point is 1693 feet above the plain. To the southward a succession of broken ranges run parallel with the Mahánadi for about 30 miles, the highest points being Mandhar, 1563 feet, and Bodápáli, 2331 feet. Of the isolated hills and small ranges scattered over the District, the loftiest are—Sunárit, 1549 feet; Chelá, 1450 feet; and Rosorá, 1646 feet.

The only important river is the MAHANADI, which rises in Ráipur District, and, after entering Sambalpur, flows east and south-east for about 65 miles, passing Chandrapur and Padmapur, till it reaches the town of Sambalpur. It then rolls on towards the south for 45 miles, as far as Sonpur, where it bends to the east, finally falling into the sea in Orissa. As far as Chandrapur, its bed is fairly free from obstructions, but from that point to beyond Bod, boulders, *jhúú* jungle, and even trees impede its current. The principal affluents in Sambalpur are the Ib, Kelú, and Jhirá.

Sambalpur District is well cultivated, especially west of the Mahánadi, where, with the exception of the Bará Pahár tract, the jungle and forest have been completely cleared, nothing being left but mango, *mahúá*, and other fruit-trees, and here and there a small patch of *sál*. Nearly every village has its tank, often large and deep, but nowhere faced with stone. The Bará Pahár Hills are covered with dense jungle; but scattered here and there, small villages, with a fringe of cultivation, nestle in the valleys. The *khálsa* or State lands, however, yield but little valuable timber. The *zamindáris* contain tracts of *sál*, *sáj*, *dháurá*, *bijsál*, and ebony; and in the Garhját States of Phuljhar and Ráirakhol spread vast forests of *sál*.

In Sambalpur, the soil is generally light and sandy. Crystalline metamorphic rocks occupy the greater part of the District; but part of the north-west corner is composed of the sandstone, limestone, and shale, which cover so large an area in Chhatisgarh. In the north occur outlying patches of soft sandstone. Iron-ore is found in most of the *zamindáris* and in the Garhjáts or Feudatory States, the finest quality being supplied by Ráirakhol. Sambalpur has excellent sandstone for building purposes. Limestone also abounds; and the Mahánadi, near Padmapur, contains large masses of this rock of a purity resembling marble. Gold dust is yielded by the Mahánadi and the Ib; and diamonds are occasionally found at the junction of these rivers, near an island called Hirakhuddá or the Diamond Isle. In neither case, however, is the supply such as to make the business of collecting remunerative.

History.—According to tradition, the first Rájá of Sambalpur was Balráam Deva, a brother of Narsingh Deva, the 12th Mahárájá of Patná, then the head of the Garhjáts States. (See PATNA STATE.) Balráam Deva obtained from his brother a grant of the jungle country lying beyond the Ung, a tributary of the Mahánadi, and gradually acquired a considerable territory by conquest from the neighbouring chiefs of Sargujá, Gánpur, Bonai, and Bámrá. His eldest son, Harí Náráyan Deva, who followed in 1493, settled the country now called Sonpur on his second son, Madan Gopal, whose descendants still hold it. During the next two centuries the power of Sambalpur steadily increased, while that of Patná continued to decline. When Ubhaya Singh succeeded in 1732, these aggressive chiefs first came in contact with the spreading power of the Maráthás. Some guns of large calibre were passing from Cuttack up the Mahánadi, in order to be transported to Nágpur. Akbar Rája, the minister, caused the boatmen to scuttle the boats in deep water, and many Maráthá artillerymen were drowned. Akbar Rája subsequently recovered the guns, and had them mounted on the Sambalpur fort. The Rájá of Nágpur sent a strong detachment to avenge the insult and regain the guns, but it was repulsed with slaughter.

About 1797, in the reign of Jeth Singh, successor to Ubhaya Singh, another quarrel with the Maráthás arose. Náná Sáhib, a relation of the Nágpur Rájá, with a large party, was making a pilgrimage to Jagannáth, when he was treacherously attacked by the people of Sárangarh and Sambalpur, as well as of Sonpur and Bod. He pushed on, however, to Cuttack, where he found some Maráthá troops. Returning with these, after some severe fighting, he took prisoner the Bod chief and Prithwi Singh, the chief of Sonpur. As soon as the rains were over, he appeared before Sambalpur, and regularly invested the town. Jeth Singh, however, had meantime strengthened the fort, and it was only after a five months' siege that the Náná succeeded

in crossing the moat and forcing the Samlli gate. After a fierce contest, the Maráthás captured the fort, and carried off Jeth Singh and his son Maháráj Sá as prisoners to Nágpur. Bhúp Singh, a Maráthá *jamádar*, was left to administer Sambalpur on behalf of the Nágpur Government. Soon, however, he assumed an independent position; and when a large force was sent from Nágpur to compel his obedience, he called in the aid of the Ráigarh and Sárangarh people, and routed the Maráthás at the Singhora Pass. A second force was sent from Nágpur, and assisted by Chamrá Gáonthijá, whose enmity Bhúp Singh had provoked by plundering his village, seized the pass, and almost annihilated Bhúp Singh's army. The conquered chief fled to Sambalpur, and, taking with him the Ránis of Jeth Singh, made his way to Kolábirá. While there, he implored the help of the British on behalf of the Ránis; and Captain Roughsedge, with a portion of the Rámgarh local battalion, was sent to Sambalpur in 1804. Raghuji Bhonsla, the Rájá of Nágpur, however, remonstrated with the British Government for thus interfering with a country he had fairly conquered, and the British restored Sambalpur to him.

For some years, the District continued under Maráthá rule, while Jeth Singh and his son remained in confinement at Chándá; but Major Roughsedge pleaded their cause so energetically, that in 1817 Jeth Singh was restored to power. He died in the following year. After some months, during which the British Government held the country, Maháráj Sá, his son, was made Rájá, though without the feudal superiority of his predecessors over the other chiefships; while Major Roughsedge was established at Sambalpur as Assistant Agent. Maháráj Sá died in 1827, and his widow, Rání Mohan Kumári, succeeded. Disturbances immediately broke out, the most prominent of the rebels being Surendra Sá and Govind Singh, both Chauháns and pretenders to the chiefship. Villages were plundered to within a few miles of Sambalpur; and though Lieutenant Higgins drove off the rebels, it became necessary for the Agent, Captain Wilkinson, to proceed from Hazaribágh to Sambalpur. After hanging some of the insurgents, Captain Wilkinson deposed the Rání, and set up in her place Náráyan Singh, a descendant by a woman of inferior caste from Baliár Singh, third Rájá of Sambalpur. Náráyan Singh accepted his elevation very unwillingly, foreseeing the difficulties which followed immediately on the withdrawal of the British troops. Itlabhadra Sá, the Gond chief of Lakhanpur, was the first to rise, but at length he was killed at his refuge in the Bará Pahár hills.

In 1839, Major Ouseley became Assistant Agent at Sambalpur; and in the same year great disturbances occurred, caused chiefly by Surendra Sá, who claimed the throne as being descended from Madhukar Sá, fourth Rájá of Sambalpur. In 1840, he ^{of his relations murdered}

the son and father of Daryáo Singh, chief of Rámpur, and were sent as life prisoners to the jail of Chutiá Nágpur. In 1849, Náráyan Singh died without male issue, and Sambalpur lapsed to the British Government. The first acts of the new rulers were to raise the revenue assessments by one-fourth; and to resume the land grants, religious or otherwise. The Bráhmans, a powerful community in Sambalpur, went up in a body to Ráncól to appeal, but gained no redress. In 1854, a second land settlement again raised the assessments every where by one-fourth. Such a system of exaction and confiscation produced its natural results. When the Mutiny broke out three years later, the sepoy released Surendra Sá and his brother from jail, who immediately proceeded to Sambalpur. Nearly all the chiefs at once joined them, though Govind Singh, the rival pretender of 1827, held aloof.

Surendra Sá established himself with a large force in the ruins of the old fort, but was induced to give himself up to Captain Leigh. Soon afterwards, however, he escaped, and joined the rebels in the hills. From that time to 1862, the British troops in vain endeavoured to hunt him down. The most daring atrocities were committed by his band: villages friendly to the Government were plundered and burnt; Dr. Moore, a European officer, was murdered, and Lieutenant Woodbridge was killed in a fight on the Bará Pahár, and his head carried off. The proclamation of amnesty failed to win the submission of the rebels. In 1861, Major Impey was placed in charge at Sambalpur, and adopted a conciliatory policy. By lavish rewards to the chiefs who gave themselves up, he succeeded in dispersing the rebel band, and procuring the surrender in May 1862 of Surendra Sá himself. The next year, however, the disturbances recommenced. Sambalpur had recently been incorporated with the Central Provinces, and the opportunity was seized of the first visit of Mr. Temple, the Chief Commissioner, to present a petition praying for the restoration of native rule in the person of Surendra Sá. This was followed by the rising of Kamal Singh, one of Surendra Sá's captains during the rebellion, and by the recurrence of aggravated outrages. At length, on 23rd January 1864, Surendra Sá was finally arrested. No legal proof of his complicity with the rebels was forthcoming; but he was placed in confinement with some of his relations and adherents as a dangerous political offender, and since then profound peace has reigned throughout the District.

Population.—The Native States attached to Sambalpur District are elsewhere noticed in their respective places. (*See KAROND, SONPUR, RAIRAKHOL, RAIGARH, BAMRA, PATNA, and SARANGARH.*) The following statistics will therefore be confined to the *khálsa* country—the British District. A rough enumeration of the population was taken in 1866, but its results cannot be relied on in this District. The Census of 1872 disclosed a population of 523,034 persons. The

last enumeration in 1881 returned a total population of 693,499, showing an apparent increase of 170,465 persons, or 32.6 per cent., in nine years. The increase of registered births over deaths accounts for 13.1 per cent. of the increase, the balance being attributed almost entirely to defective enumeration in 1872, especially in the *samindrái* tracts.

The results arrived at by the Census of 1881 may be summarized as follows:—Area of District, 4521 square miles, with 1 town and 3256 villages; number of houses, 168,381, namely, occupied 160,359, and unoccupied 8022. Total population, 693,499, namely, males 346,549, and females 346,950. Average density of population, 153 persons per square mile; towns and villages per square mile, 0.72; persons per town or village, 213; houses per square mile, 35.5; persons per house, 4.3. Classified according to sex and age, there are—under 15 years, boys 157,661, and girls 150,836; total children, 308,497, or 44.5 per cent. of the population: 15 years and upwards, males 188,888, and females 196,114; total adults, 385,002, or 55.5 per cent.

Religion.—Classified according to religion, the population of Sambalpur District consists of—Hindus, 632,747, or 91.2 per cent.; Kabírpánthis, 10,120; Satnámis, 212; Kumbhipáthias (only found in Sambalpur District), 692; Muhammadans, 2966; Christians, 110; and tribes professing aboriginal religions, 46,652. The total aboriginal population by race as apart from religion, however, is returned at 231,520, namely, Gonds, 57,327; Savars or Sauras, 65,845; Baigás, 40,696; Kurás, 18,643; Kandhs, 16,672; Kols, 40,696; Kawárs, 2303; and Bhils, 421.

Among the recognised Hindu castes, Bráhmans number 21,828; Rájputs, 5644; and Káyasths, 2159. The lower-class Hindus, who comprise the great mass of the population, include the following castes:—Gaur, 79,079; Gándá, 78,622; Koltá or Koltá, 67,102; Keut or Kewát, 27,453; Telí, 22,250; Máli, 10,824; Chamár, 9523; Dumál, 9006; Dhobí, 7387; Panká, 6637; Ghasiá, 6543; Lohár, 6557; Kumbhár, 6148; Kallár, 6061; Náí, 4828; Banjárá, 4370; Korí, 3486; Marár, 2596; Kurmí, 2156; Koshtí, 1941; Sonár, 1895; and Mahár, 1286.

Town and Rural Population.—The population is entirely rural, and Sambalpur town (population in 1881, 6658) is the only place which contains upwards of five thousand inhabitants. Of the 3256 villages, no less than 2064 are mere hamlets with less than two hundred inhabitants; 923 contain between two hundred and five hundred; 244 between five hundred and a thousand; 21 between one thousand and two thousand; 3 between two thousand and three thousand; and 1 between three thousand and five thousand inhabitants.

As regards occupation, the Census Report divides the male popula-

tion into the following six classes:—(1) Professional class, including civil and military, 5206; (2) domestic class, including inn and lodging-house keepers, 2597; (3) commercial class, including bankers, merchants, traders, carriers, etc., 3917; (4) agricultural and pastoral class, including gardeners, 166,420; (5) manufacturing and industrial class, including all artisans, 31,845; and (6) indefinite, non-productive, and unspecified class, comprising general labourers and male children, 3299.

Agriculture.—Of the total area of 4521 square miles in the British District, only 1125 square miles were cultivated in 1883-84; and of the portion lying waste, 888 square miles were returned as cultivable, while 2508 square miles are uncultivable. Of the total area, however, 161 miles are held revenue-free, leaving 4360 square miles assessed for Government revenue, of which 1018 square miles were cultivated, 880 square miles available for cultivation, and 2462 square miles uncultivable waste. Even of this area, 2891 square miles are comprised within 20 estates or *zamindari* chiefships, paying a quit-rent or tribute of only £1401, or an average of one penny per cultivated acre. The Government land revenue proper is derived from 1469 square miles, of which 498 square miles are cultivated, 37 square miles available for cultivation, and 934 square miles uncultivable waste. Total Government land revenue with local cesses, excluding the *zamindaris*, £10,196, or an average of 7½d. per cultivated acre. Irrigation in 1883-84 was practised on 79,515 acres, entirely by private enterprise.

Rice forms the staple crop, and in 1883 occupied 579,991 acres. No wheat is grown, but 'other food grains' were produced on 61,743 acres; while 31,563 acres were devoted to oil-seeds, 33,484 acres to cotton, and 9449 acres to sugar-cane. The agricultural stock in 1883-84 was thus returned—cows, bullocks, and buffaloes, 222,053; horses, 684; ponies, 963; sheep and goats, 39,202; pigs, 1063; while carts numbered 12,138, and ploughs 51,177.

Of the adult male and female agricultural population in 1881, namely, 252,419, landed proprietors were returned as numbering 4411, tenant cultivators, 147,745; assistants in home cultivation, 262; agricultural labourers, 33,651; the remainder being made up of graziers, tenants of unspecified status, estate agents, etc. Area of cultivated and cultivable land available for each adult agriculturist, 5 acres. The ordinary price of rice in 1883-84 was 3s. per cwt. Skilled labourers earn from 6d. to 8d. per day, and unskilled labourers 2½d. to 3d. per day.

Trade and Commerce.—The manufactures of Sambalpur are few and unimportant. The Koshtis, however, weave *tasar* silk cloth of an even texture and unfading lustre; and the Kánwárs manufacture vessels of brass and bell metal. Nearly every village also contains weavers of

coarse cotton cloth, and the Sonárs make rude ornaments of gold and silver. The principal exports from the District are rice, oil-seeds, raw sugar, stick-lac, *tasar* silk, cotton, and iron. Principal imports—salt, refined sugar, European piece-goods, cocoa-nuts, muslins, fine cloths of native make, and metals. The chief trade is with Cuttack and Mírzápur. In the Orissa famine of 1866-67, no less than 30,178 *maunds* (about 1100 tons) of rice, valued at £10,171, were exported to Cuttack. None of the roads in Sambalpur are bridged or metalled. The chief lines of communication are the roads from Sambalpur town to Raipur *via* Sánkra on the Jonk river; and to Cuttack *via* Rairákhhol and Angúl. Tracts also lead from Sambalpur to the Biláspur frontier, by Padmapur and Chandrapur, to Bínka, and towards Ráncól. The Mahánadi affords means of communication by water for 90 miles.

Administration.—In 1861, Sambalpur was formed into a separate District of the British Government of the Central Provinces. It is administered by a Deputy Commissioner, with Assistants and *tahsildars*. Total revenue in 1883-84, £22,445, of which the land yielded £11,387. Total cost of District officials and police of all kinds, £9537; number of civil and revenue judges of all sorts within the District, 8; magistrates, 9. Maximum distance from any village to the nearest court, 66 miles; average distance, 25 miles. Number of regular and town police, 365, costing £4721; being 1 policeman to about every 12·4 miles and every 1900 inhabitants. The daily average number of convicts in jail in 1883 was 127, of whom 11 were females. The number of Government or aided schools in the District under Government inspection in 1883-84 was 136, attended by 7817 pupils. The Census Report of 1881 returned only 3434 boys and 171 girls as under instruction, besides 10,114 males and 298 females able to read and write, but not under instruction.

Medical Aspects.—The average temperature in the shade at the civil station during 1883 is returned as follows:—May, highest reading 116·2° F., lowest 75·3° F.; July, highest 101·3° F., lowest 72·3° F.; December, highest 79·7° F., lowest 46·8° F. The rainfall for that year amounted to 78·51 inches, the average being 57·5 inches. The climate of Sambalpur is considered very unhealthy. The prevailing disease is fever, especially from September to November. It proves most fatal to new-comers, natives as well as Europeans. Bowel complaints are also common and deadly, and cholera appears nearly every hot season, owing to the gatherings at the temple of Jagannáth at Purl. In 1883, two charitable dispensaries afforded medical relief to 21,035 in-door and out-door patients. The death-rate per thousand in 1883-84 was returned at 26·19, the mean of the previous five years being 26·07, but these figures cannot be trusted. [For further information regarding Sambalpur, see the *Central Provinces Gazetteer*, by Mr. (now Sir

Charles) Grant (Nágpur, 1870). Also the *Report of the Land Settlement of Sambalpur District*, between 1872 and 1877, by Mr. A. M. Russell, published 1883; the *Central Provinces Census Report* for 1881; and the several annual Administration and Departmental Reports of the Central Provinces Government.]

Sambalpur.—*Tahsil* or Sub-division of Sambalpur District, Central Provinces. Area, 1500 square miles, with 1 town and 1499 villages, and 69,418 houses. Population (1881) 297,361, namely, males 147,973, and females 149,388; average density of the population, 169·1 persons per square mile. Of the total area of the *tahsil*, 893 square miles are comprised within nine *zamindári* estates or chiefships, which pay only a nominal tribute or quit-rent; while 135 square miles are held entirely revenue-free. The Government revenue-paying lands occupy an area of 730 square miles, of which 241 square miles are cultivated, 14 square miles are cultivable, and 475 square miles are uncultivable waste. Total adult agricultural population, 67,462, or 40·17 per cent. of the whole population in the *khálsa* or Government tract. Average area of cultivated and cultivable land available for each adult agriculturist, 3 acres. Total Government land revenue, including local rates and cesses levied on land, £3960, or an average of 5d. per cultivated acre. Sambalpur *tahsil* contained in 1883, 5 civil and 7 criminal courts (including the District head-quarters courts); with 4 police stations (*thánds*) and 11 outpost stations, a regular police force numbering 97 men, and a village watch or rural police of 715 *chaukidárs*.

Sambalpur.—Principal town and administrative head-quarters of Sambalpur District, Central Provinces. The town is situated in lat. 21° 27' 10" N., and long. 84° 1' E., on the north bank of the Mahánadi, which, during the rainy season, becomes nearly a mile broad, but at other times flows in a small stream 50 yards in width. Opposite the town and station, the river bed is a mass of rocks covered with thick *jhárú* jungle; on each side the banks are richly wooded with mango and other groves, while to the south rises a stately background of lofty hills. Population (1872) 11,020, (1881) 13,939, namely, males 6658, and females 7281. Hindus number 10,619; Muhammadans, 1298; Kumbhípathís, 79; Kabírpanthís and Satnámis, 6; Christians, 104; and tribes professing aboriginal religions, 1833. Municipal income in 1882-83, £1808, of which £1531 was derived from taxation; average incidence of taxation, 2s. 3½d.

The town proper has been much improved since 1864, when a cart could only with great difficulty pass through the main street. To the north-west lie the ruins of the fort—a crumbling stone wall on the river face, and a few mouldering bastions. The moat can still be traced; but no gateway remains except that of Samláí, near the temple of the goddess of that name, who was apparently the tutelary divinity of

Sambalpur. Within the fort stand several other temples, the principal of which are those of Padmeswari Devi, Bará Jagannáth, and Anant Sajjá, all built during the 16th century. They are of uniform design, and remarkable neither for elegance nor solidity. Beyond the fort extends the Bará Bázár, originally a mere market-place, but now a populous suburb. Besides the Government court-house and the Sub-divisional office on the river bank, the principal buildings are the Commissioner's circuit-house, post-office, a jail lately built on the standard plan, and 2 *saráis*, as well as a handsome terrace-roofed market-place. A native gentleman has lately built a dispensary with female wards, and a District schoolhouse. Till recently, cholera visited the town almost every year, owing chiefly to the influx of pilgrims returning from Puri. Of late, however, sanitary precautions have done much to prevent the epidemic, and the increase of vaccination is gradually restraining the ravages of small-pox.

Sambhal.—*Tahsil* of Moradábád District, North-Western Provinces, lying in the plain country between the Sot and the Ganges, conterminous with Sambhal *fargand*. It is about 32 miles long by 15 miles broad, and consists of two great natural divisions, the *katchr* or 'hard,' and the *bhúr* or sandy tracts. Their border-line runs north-east and south-west, down the centre of the *tahsil*, parallel to the course of the Sot. The low lands of that river form a belt of from two to three miles wide, right through the *katchr* tract. The soil of the *katchr* is described as of a dark colour, assimilating in appearance to *matijár*; and some villages in which it predominates are among the finest in the District. The *bhúr* or sandy tract consists of ridges of loose, soft sand, alternating with extensive flats of more cohesive soil, in which there is a very slight admixture of loam. All over the *bhúr* tract are large unploughed wastes, utilized in dry seasons as grazing grounds. Several important but unmetalled roads meet at Sambhal town.

The total area of Sambhal *tahsil* in 1881-82 was 468·74 square miles, of which 443·13 square miles were assessed for Government revenue, namely, 360·34 square miles cultivated, 55·69 square miles cultivable, and 27·10 square miles uncultivable. Population (1881) 248,107, namely, males 130,441, and females 117,666; average density of population, 530 persons per square mile. Classified according to religion, Hindus numbered 173,850; Muhammadans, 73,808; Christians, 273; and Jains, 180. Of the 465 towns and villages comprising the *tahsil*, 323 had less than five hundred inhabitants; 111 between five hundred and a thousand; 28 between two and three thousand; and 3 upwards of five thousand inhabitants. Total Government land revenue (1881-82), £35,291, or including local rates and cesses levied on land, £39,832. Total rental paid by cultivators, including cesses, £81,181. Sambhal *tahsil* contained in 1885, 1 civil and 2 criminal courts;

number of police circles (*thánds*), 3; strength of regular police, 79 men; village watch or rural police (*chaukidárs*), 424.

Sambhal.—Town and municipality in Moradábád District, North-Western Provinces, and head-quarters of Sambhal *tahsil*; situated in lat. $28^{\circ} 35' 5''$ N., and long. $78^{\circ} 36' 45''$ E., on the Aligarh road, 23 miles south-west of Moradábád town, and 4 miles west of the Sot river, in the midst of a cultivated and well-wooded plain. The modern town covers the summit of an extensive mound, composed of remains and *díbris* of the ancient city. Two heaps of ruins, known as Bhaleswar and Bikteswar, mark the old bastions of the city wall. The town formed the head-quarters of the local Government from the earliest period of Muhammadan supremacy, and was the capital of a *sarkár* under Akbar. Population (1881) 21,373, namely, males 10,659, and females 10,714; number of houses, 4710. Classified according to religion, Muhammadans number 13,965; Hindus, 7333; Jains, 38; and Christians, 37. Municipal income (1883-84), £1588, of which £1471 was derived from taxation; average incidence of taxation, 10d. per head of the population (35,196) within municipal limits.

Sambhal is a prettily situated town, with the houses mostly built of brick. Only in the town and suburbs are there any metalled roads; but unmetalled ones connect it with Moradabád, Bilárá, Amrohá, Chandausi, Bahjoi, and Hasanpur. The public buildings include the *tahsílí* or sub-collectorate offices, *munsifí* or subordinate judges' court, police station, post-office, dispensary, American mission church and schools, several municipal schools, distillery, and a *saríí* or native inn. Refined sugar is the chief manufacture, and also the principal article of trade. Wheat and other grains and *ghí* are also exported, and there is some export of hides. Cotton cloth is manufactured, but chiefly for local wants.

Sámbar.—Great salt lake in the States of Jaipur (Jeypore) and Jodhpur, Rájputána. The lake lies between $26^{\circ} 52'$ and $27^{\circ} 2'$ N. lat., and between $74^{\circ} 57'$ and $75^{\circ} 16'$ E. long., on the joint border of the States, 40 miles north-west of Ajmere, and within the line of hills which mark the general north-westward run of the Aravalli range as it begins to lose continuity and to subside. The land all round slopes towards the lake, which thus forms a great basin with no outlet, containing a shallow sheet of water. The surrounding country is arid and sterile, being composed of rocks abounding in limestone and salt, and belonging to the Permian system, and it is supposed that the salt of the lake is derived from the washings of these rocks. The bottom consists of a tenacious black mud, resting on loose sand. When full, the lake forms a sheet of water measuring about 20 miles in length, from 3 to 10 miles in breadth, and from 1 to 4 feet in depth.

After the rains, in August and September, the waters of the lake begin to evaporate, and this process goes on almost uninterruptedly from October to June. In very hot and dry summers, the wet bed is little more than a mile in length and less than half a mile across. The lake's longest stretch is nearly east and west; and the deeper portion, which never dries up, and which is locally called 'the treasury,' is situated near the centre of the lake, almost opposite a bold rocky promontory (Máta-ki-devi) which juts out from the southern shore.

In the dry season, the view of the lake is very striking. Standing on the low sandy ridges which confine the basin on the south, one may see what looks like a great sheet of snow, with pools of water here and there, and a network of narrow paths marking the near side of it. What appears to be frozen snow is a white crisp efflorescence of salt. The salt is both held in solution in the water of the lake, and also pervades in minute crystals the whole substance of black mud that forms so large a part of its bed.

This valuable property has often been fiercely contested. The lake was worked by the Imperial administration of Akbar and his successors up to the time of Ahmad Sháh, when it fell back into the hands of the Rájput Chiefs of Jaipur and Jodhpur. The eastern shore, and part of the southern shore, are now the joint possession of Jaipur and Jodhpur; the rest belongs to Jaipur. During the ten years 1835 to 1844, the Government of India, in order to repay itself a portion of the expenses incurred in repelling the predatory incursions of the Rájputs into British territory, took the salt-making into its own hands; but with this exception, the lake has been owned and worked jointly by the Jaipur and Jodhpur Governments from the 17th century to 1870, when the British Government became lessees under separate treaties concluded with the two chiefs.

As soon as the salt is formed, native labourers of both sexes wade out to it through the mud, and placing their hands under the salt crust, lift it off in good-sized cakes into baskets. A man brings to shore in this way about half a ton of salt a day. The salt is also made in shallow pans, into which the brine is baled; and in walled enclosures, the beds of which are sunk below the level of the lake. Nearly the whole of the salt extracted is white or slightly discoloured. Some portions are blue and red, the varieties being said to be due to the presence of microscopic algæ. The Sámbar lake supplies nearly all the chief salt marts of the Punjab, the North-Western Provinces, and Central India. The town of Sámbar within the joint jurisdiction of Jaipur and Jodhpur States, and Nawa and Gudha in Jodhpur State on the opposite side of the lake, have recently been connected by a branch line with the Rájputána-Málwá Railway. According to travellers in the early part of this century, the dimensions of the lake were larger

than they are at present, and reached as much as 50 miles in length by 10 in breadth during periods of heavy rain.

The average yearly out-turn for the 15 years ending 1883-84, since the Government of India leased the lake, has been 2,800,000 *maunds* (about 100,000 tons). The average cost of storage and extraction, about 6 *pies* (three farthings) a *maund* (82½ lbs.). From the beginning of the lease to 1883-84, the quantity of salt manufactured was 42,039,480 *maunds* (about 1,500,000 tons); the total sales amounted to 31,998,365 *maunds*, yielding a revenue of £1,393,739; total charges, including treaty payments, £1,210,983; net credit balance, £182,756. In 1883-84, the total quantity of salt manufactured at Sambhar lake was 7,111,353 *maunds*. Gross realizations, including duty, £880,606; the direct charges amounted to £58,395, and payments made under treaties, £75,495; total, £133,890, leaving a surplus of £746,716. The labour employed in 1883-84 was—labourers, 421,925; carts, 38,757; cattle, 33,987.

Sám̐bhar.—Town within the joint jurisdiction of Jaipur and Jodhpur States, on the bank of the Sám̐bhar lake, Rájputána; situated 39 miles south-west of Jaipur city. Population (1881) 5574. Hindus number 4831, and Muhammadans 743. A station on the Sám̐bhar branch of the Rájputána-Máiwá Railway. Dispensary and post-office.

Sambhuganj.—Village in Maimansingh District, Bengal; 3 miles east of Nasrábád. Population (1881) 938. One of the busiest marts in the District for country produce of all kinds; large exports of jute. In 1876-77, the registered exports from Sambhuganj included 72,000 *maunds* of jute (mostly sent direct to Calcutta), 31,000 *maunds* of rice, and 9500 *maunds* of mustard seed. No later trade statistics are available.

Sameswari (*Someswari*, or *Samsáng*)—River in the Gáro Hills, Assam. Rising near the station of Turá, it flows first in an easterly direction along the north of the Turá range, and then turns south through a picturesque gorge and finds its way into the plains in the Bengal District of Maimansingh. It finally empties itself into the Kanks river in *parganá* Susáing. Both in size and utility, the Sameswari is the most important river in the Gáro Hills. It is navigable up-stream as high as Siju, about 20 miles within the hills. Here its channel is interrupted by a bed of granite rocks and rapids. In several other portions of its course it again becomes navigable for canoes. Valuable outcrops of coal have been discovered and surveyed in the Sameswari valley, but none has yet been worked. Limestone of good quality abounds on the river banks, and there are some curious caverns in the limestone formation. The largest of these caves lies near Siju, and has been explored for a whole day without reaching the source of a small stream which issues from the cave. Above Siju, the Sameswari flows through

a tract of sandstone, in which extensive coal-beds have been discovered on both sides of the river; but up to 1884 they had not been worked otherwise than experimentally. In its upper course are several magnificent gorges, with rocky cliffs, clothed in tropical vegetation. The water swarms with fish, including the excellent *milsir*; and the Gáros are enthusiastic fishermen.

Sami.—Town in Rádhhanpur State, Bombay Presidency.—*See* SHAMI.

Samla.—Petty State in the Jháláwár division of Káthiáwár, Bombay Presidency; consisting of 2 villages, with 4 separate tribute-payers or shareholders. Area, 13 square miles. Population (1881) of the State, 1330; and of Samla village, 757. Estimated revenue, £762; of which £96 is paid as tribute to the British Government, and £10, 8s. to the Nawáb of Junágarh.

Sámnagar.—Town in the Twenty-four Pargáná District, Bengal.—*See* SYAMNAGAR.

Samod.—Town in Jaipur State, Rájputána. A large and flourishing town, the principal place of Samod *zámindárí*. It is defended by a fort of some strength on the summit of a hill, at the base of which the town stands. Samod *zámindárí* is held by one of the principal *thákurs* of Jaipur State, and yields an annual revenue of £11,000.

Sampáji Ghát.—One of the passes connecting South Kánara District, Madras Presidency, with Coorg. Good road; practicable for wheeled carriages.

Sámpgáon.—Sub division of Belgáum District, Bombay Presidency. Area, 425 square miles; villages, 123. Population (1872) 131,504; (1881) 119,843, namely, males 59,565, and females 60,278. Hindus number 106,552; Muhammadans, 10,027; and 'others,' 3264. Sám-pgáon has great variety of soil and surface. From the hilly west, the country gradually sinks eastwards into a great black cotton plain. In the south-west, ranges of quartz and ironstone, about 150 feet high, and a quarter to half a mile apart, run nearly north and south. The Malprabha river crosses the middle of the Sub-division from west to east. Of a total area of 424 square miles, 22 square miles are occupied by the lands of alienated villages. The rest contains 217,179 acres of cultivable land, of which 52,998 acres are alienated lands in Government villages; 4223 acres, uncultivable land; 1277 acres, grass; 16,627 acres, forests; and 12,927 acres, village sites, roads, etc. In 1881-82, out of 158,320 acres held for tillage, 18,598 acres were under grass. Of the remaining 139,722 acres, 17,726 acres were twice cropped. Cereals and millets occupied 115,281 acres; pulses, 18,637 acres; oil seeds, 3524 acres; fibres, 16,452 acres; and miscellaneous crops, 3574 acres. In 1883-84 the Sub-division contained—criminal courts, 2; police circles (*stipends*), 6; regular police, 49 men; village watch (*chakildars*), 482. Land revenue, £23,913.

Sámpgáon.—Town in Belgáum District, Bombay Presidency, and head-quarters of Sámpgáon *tahsil*; situated about 18 miles south-east of Belgáum town, in lat. $15^{\circ} 36' N.$, long. $74^{\circ} 50' E.$ Population (1881) 3629. Besieged and captured in 1683 by Akbar's son, Prince Muham-mad Muazzam. Towards the end of the seventeenth century, the founder of the Kittur Desái family settled at Sámpgáon, which lapsed to Government after the Kittur outbreak in 1824. Sámpgáon has a few looms; weekly market on Sundays, when cattle, cloth, cotton, and grain are sold. Post office; library; two schools, one for girls; and an old mosque.

Sámpla.—East central *tahsil* of Rohtak District, Punjab. Area, 417 square miles; towns and villages, 123; houses, 19,855; families, 30,516. Total population (1881) 142,177, namely, males 76,004, and females 66,173. Average density of population, 341 persons per square mile. Classified according to religion, the population consists of—Hindus, 129,508; Muhammadans, 12,394; Jains, 263; Sikhs, 11; and 'others,' 1. Of the 123 towns and villages, 33 contain less than five hundred inhabitants; 37 between five hundred and a thousand; 52 between one and five thousand; and 1 between five and ten thousand inhabitants. The average area under tillage for the five years ending 1881–82 is returned at 306 square miles, or 195,909 acres, the area under the principal crops being as follows:—*joár*, 47,134 acres; *báyra*, 41,043 acres; gram, 32,265 acres; wheat, 25,036 acres; barley, 17,076 acres, other food-grains, 1352 acres; cotton, 14,279 acres; sugar-cane, 6078 acres; the remainder consisting of a little vegetables, indigo, and tobacco. Revenue of the *tahsil*, £25,898. The local administrative staff consists of a *tahsildár* and an honorary magistrate, presiding over 1 civil and 2 criminal courts. Number of police circles, 3; strength of regular police, 69 men, village watch or rural police, 217.

Sámpla.—Village in Rohtak District, Punjab, and head-quarters of Sámpla *tahsil*; situated in lat. $28^{\circ} 47' N.$, and long. $76^{\circ} 49' E.$, on the Rohtak and Delhi road, half-way between Rohtak town and Bahádur-garh. *Tahsili*, police station, post-office, village school, and *sardí*.

Samra (Semra).—Town in Ihtumadpur *tahsil*, Agra District, North-Western Provinces; situated in lat. $27^{\circ} 19' 26' N.$, long. $78^{\circ} 7' 10' E.$, 14 miles north-west from Ihtumadpur town. Population (1881) 4797. Bi-weekly market, and village school.

Samrála.—Eastern *tahsil* of Ludhiána District, Punjab. Area, 288 square miles. Population (1881) 152,509, namely, males 84,838, and females 67,671; average density of population, 530 persons per square mile. Classified according to religion, there are—Hindus, 89,154; Muhammadans, 46,223; Sikhs, 16,893; and 'others,' 239. Revenue of the *tahsil*, £27,527. The local administrative staff consists of a

tahsildár and a *munsif*, presiding over 1 criminal and 2 civil courts. Number of police circles (*thánás*), 3; strength of regular police, 58 men; village watch or rural police, (*chaukidárs*), 244. Samrála, the head-quarters of the *tahsil*, is a small village, and was only chosen as such on account of its central position.

Samsa Parvat.—Peak of the Western Gháts bordering on South Kánara District, Madras Presidency, 6300 feet high. Lat. $13^{\circ} 8' N.$, long. $75^{\circ} 18' E.$ The hill is used as a sanitarium by the European residents of South Kánara; there are two bungalows, but no village; easy access by road (56 miles) from Mangalore. The climate, except from June to September, during the south-west monsoon, is delightful; and for sportsmen there is abundance of game. Wood, water, and grass are also plentiful. There is no plateau, properly speaking, but undulating ground along the line of the mountain for some miles. English fruits, flowers, and vegetables grow well, and in most respects the climate and soil resemble those of COONOR (Kunur).

Sámthar (*Samphthar*, *Sumpter*).—Native State in Bundelkhand, under the political superintendence of the Bundelkhand Agency, Central India; lying between $25^{\circ} 42'$ and $25^{\circ} 57' N.$ lat., and between $78^{\circ} 51'$ and $79^{\circ} 11' E.$ long. Area, 174 square miles. Population (1881) 38,633, namely, males 20,403, and females 18,230; occupying 7131 houses, in 1 town and 87 villages. Hindus number 36,195; Muhammadans, 2284; Jains, 56; Christians, 5; and aboriginal tribes (Moghias), 93. Estimated revenue, £40,000. Sámthar is bounded on the north and west by Gwalior; on the south-west, south, and south-east by the British District of Jhānsi; and on the east by Jalāun District. The State of Sámthar was separated from Datiya only one generation previous to the British occupation of Bundelkhand. When the British first entered the Province, Rájá Ranjit Singh requested to be taken into the friendship and under the protection of the British Government; but nothing definite was done till 1817, when a treaty was concluded with him. The chief is entitled to a salute of 11 guns. He has received the right of adoption. The military forces of the State are 300 cavalry and 2000 infantry, with 35 guns and 150 gunners.

Sámthar.—Chief town of Sámthar State, Bundelkhand, Central India. Lat. $25^{\circ} 51' N.$, long. $78^{\circ} 55' E.$ Population (1881) 7891, namely, Hindus, 6905; Muhammadans, 980; and 'others,' 6.

Sámulkota (*Chámarlákota*).—Town in Cocanáda *taluk*, Godávári District, Madras Presidency.—See CHAMARLAKOTA.

Sanála.—Petty State in the Gohelwar division of Káthiáwár, Bombay Presidency; consisting of 1 village, with 2 separate tribute-payers or shareholders. Area, 51 square miles. Population (1881) 500. Estimated revenue, £270; £30, 14s. is paid as tribute to the Gáckwár of Baroda, and 30s. to the Nawáb of Junágarh.

Sánand.—Sub-division of Ahmadábád District, Bombay Presidency. Area, 360 square miles. Population (1872) 73,229; (1881) 76,964, namely, males 39,249, and females 37,715; occupying 20,194 houses, in 1 town and 84 villages. Hindus number 68,811; Muhammadans, 4690; and 'others,' 3463. Except an undulating strip of land on the west, Sánand is in the centre a rich plain of light soil with well-wooded fields; and in the south and west a barer stretch of black soil. The people live in prosperous villages, with several fine ponds. Water-supply generally good. Of a total area of 360 square miles, 162 square miles belong to alienated and *talukdári* villages. The remainder contains 126,547 acres of occupied land, of which 38,696 acres are alienated land in Government villages; 69,525 acres cultivable waste; 39,703 acres uncultivable waste; and 17,319 acres village sites, roads, etc. In 1860-61, the year of settlement, 5674 holdings were recorded, with an average area of $12\frac{1}{4}$ acres, paying an average Government assessment of £1, 9s. 0½d. In 1877-78, 74,517 acres were under actual cultivation, of which 657 acres were twice cropped. Cereals and millets occupied 62,144 acres; pulses, 2771 acres; oil-seeds, 1264 acres; fibres, 8163 acres; and miscellaneous crops, 832 acres. In 1883 the Sub-division contained—criminal courts, 2; police circle (*tháná*), 1; regular police, 54 men, village watch (*chaukidárs*), 292. Land revenue, £17,628.

Sánand.—Chief town of the Sánand Sub-division of Ahmadábád District, Bombay; situated 16 miles west of Ahmadábád city, in lat. $22^{\circ} 59' N.$, and long. $72^{\circ} 25' 30'' E.$ Population (1881) 6984. Hindus numbered 5463; Muhammadans, 299; Jains, 1212, Christian, 1; and 'others,' 9. Sánand is a station on the Bombay, Baroda, and Central India Railway, 18 miles from Ahmadábád. Post-office, dispensary, and *dharmshákh*.

Sanavárapeta.—Town in Ellore *taluk*, Godávári District, Madras Presidency. Population (1881) 3200. Hindus numbered 2773, and Muhammadans 427. Number of houses, 597.

Sanáwan.—Northern *tahsil* of Muzaffargarh District, Punjab; consisting of a high central upland, almost barren, known as the *thal*, together with two strips of lowland along the banks of the Indus and the Chenáb. Area, 1327 square miles; number of towns and villages, 127; houses, 15,413; families, 17,177. Population (1881) 80,851, namely, males 43,656, and females 37,195. Average density of population, 61 persons per square mile. Classified according to religion, Muhammadans numbered 71,584; Hindus, 9555; and Sikhs, 712. Of the 127 towns and villages, 76 contain less than five hundred; 29 between five hundred and a thousand; and 22 between one and five thousand inhabitants. The average area under tillage for the five years ending 1881-82 is returned at $158\frac{1}{2}$ square miles, or 101,438 acres,

the area under the principal crops being—wheat, 51,796 acres; *jowar*, 6960 acres; *baajra*, 6504 acres; gram, 2795 acres; *moth*, 2052 acres; barley, 1829 acres; rice, 633 acres; cotton, 8334 acres; indigo, 3981 acres; tobacco, 259 acres; sugar-cane, 105 acres; and vegetables, 382 acres. Revenue of the *tahsil*, £14,099. The local administrative staff consists of a *tahsildar* and an honorary magistrate, presiding over 1 civil and 2 criminal courts. Number of police circles (*thānds*), 2; strength of regular police, 51 men; village watch or rural police (*chaukidars*), 105.

Sanāwar.—Plot of land in Simla District, Punjab. Made over by the British Government in 1852 as the site of the Lawrence Military Asylum. The buildings stand in lat. $30^{\circ} 54' 35''$ N., and long. $77^{\circ} 2' 10''$ E., on a wooded hill facing Kasauli, which is 3 miles distant. They consist of boys and girls' schools, and the residences of the Principal, with a staff of teachers, and a church. The institution, which is undenominational, accommodates from 400 to 500 children. In September 1883, there were 424 boys and girls on the rolls, including 64 in the orphanage.

Sānchi.—Village in the Native State of BHOPAL, Central India; situated on the left bank of the Betwa river, about $5\frac{1}{2}$ miles south-west of Bhilsa, and 20 miles north-east of Bhopāl city. Sānchi is famous as the site of some of the most extensive and remarkable Buddhist remains in India, the centre of the great group described by General Cunningham under the name of '*The Bhilsa Topes*.'

The present village of Sānchi is situated on a low ridge of sandstone, the general direction of which is from north to south, the whole summit of the hill being covered with ruins. The hill is flat-topped and isolated, with a steep cliff to the eastward, and to the westward an easy slope, covered with jungle at the foot, and near the top broken into steps by horizontal ledges of rock.

The principal buildings which now remain occupy only the middle part of the level summit, and a narrow belt leading down the hill to the westward. They consist of one great *stupa* or tope, with its railing and other adjuncts; about ten smaller *stupas*, some now showing nothing more than the foundations; a stone bowl, $4\frac{1}{2}$ feet in diameter and $2\frac{1}{2}$ feet deep, supposed to have once contained Buddha's holy nettle, and other objects of antiquarian interest. The summit of the hill, on which these remains are found, has a gentle slope in the same direction as the dip of the strata; and the level of the court of the great *stupa* is about 12 or 15 feet below that of a ruined *vihāra* and temple on the eastern edge of the precipice. The hill, which is about 300 feet in height, is formed of a light red sandstone, hard and compact in texture, but subject to split. This stone has been used for all the topes and other buildings where mere hardness and durability

were required ; but for the colonnades and sculptured gateways, a fine-grained white sandstone was brought from the Udayagiri Hill, $3\frac{1}{2}$ miles to the northward. The village is now very small ; but the numerous ruins scattered over the hill between Sanchi and Kánakhara show that there once was a large town on this site. Plaster casts of the gateways, etc., of the topes have been sent to England.

Fergusson (*History of Indian and Eastern Architecture*, 1876, page 61) thus writes of this group of remains :—

‘The principal of these, known as the Great Tope at Sanchi, has been frequently described, the smaller ones are known from General Cunningham’s descriptions only ; but altogether they have excited so much attention that they are perhaps better known than any group in India. We are not, however, perhaps justified in assuming, from the greater extent of this group as now existing, that it possessed the same pre-eminence in Buddhist times. If we could now see the topes that once adorned any of the great Buddhist sites in the Doáb or Behar, the Bhilsa group might sink into insignificance. It may only be that, situated in a remote and thinly peopled part of India, they have not been exposed to the destructive energy of opposing sects of the Hindu religion, and the bigoted Moslem has not wanted their materials for the erection of his mosques. They consequently remain to us, while it may be that nobler and more extensive groups of monuments have been swept from the face of the earth.

‘Notwithstanding all that has been written about them, we know very little that is certain regarding their object and their history. Our usual guides, the Chinese Pilgrims, fail us here. Fa-Hian never was within some hundreds of miles of the place ; and if Hiuen Tsiang ever was there, it was after leaving Ballabhi (Valabhi), when his journal becomes so wild and curt that it is difficult, sometimes impossible, to follow him. He has, at all events, left no description by which we can now identify the place, and nothing to tell us for what purpose the Great Tope or any of the smaller ones were erected. The *Mahdwanso*, it is true, helps us a little in our difficulties. It is there narrated that Asoka when on his way to Ujjain, of which place he had been nominated governor, tarried some time at Chétyagiri, or, as it is elsewhere called, Wessanagara, the modern Bísagar, close to Sanchi. He there married Devi, the daughter of the chief, and by her had twin sons, Ujjenio and Mahindo, and afterwards a daughter, Sanghamitta. The two last-named entered the priesthood, and played a most important part in the introduction of Buddhism into Ceylon. Before setting out on this mission, Mahindo visited his royal mother at Chétyagiri, and was lodged in “a superb *vihára*,” which had been erected by herself. In all this there is no mention of the Great Tope, which may have existed before that time ; but till some building is

found in India which can be proved to have existed before that age, it will be safe to assume that this is one of the 84,000 topes said to have been erected by Asoka. Had Sanchi been one of the eight cities which obtained relics of Buddha at the funeral pyre, the case might have been different; but it has been dug into, and found to be a *stupa*, and not a *daghoba*. It consequently was erected to mark some sacred spot or to commemorate some event, and we have no reason to believe that this was done anywhere before Asoka's time.

'On the other hand, two smaller topes on the same platform contained relics of an undoubted historical character. That called No. 2 Tope contained those of ten Buddhist teachers who took part in the third great convocation held under Asoka, and some of whom were sent on missions to foreign countries, to disseminate the doctrines then settled; and No. 3 Tope contained two caskets. One of these enclosed relics of Maha Moggalana, the other of Sariputra, friends and companions of Buddha himself, and usually called his right and left hand disciples. It does not of course follow that this *daghoba* is as old as the time of Buddha; on the contrary, some centuries must elapse before a bone or rag belonging to any mortal becomes so precious that a dome is erected to enshrine it. The great probability seems to be that these relics were deposited there by Asoka himself, in close proximity to the sacred spot which the Great Tope was erected to commemorate. The tope containing relics of his contemporaries must of course be much more modern, probably contemporary with the gateways, which are subsequent to the Christian era.'

San-daw (*Tshan-daw*).—A small pagoda situated amid the hills on the left bank of Sandoway town, Sandoway District, Arakan Division, Lower Burma. Built in 784 A.D. by King Nyo-kin, to enshrine a hair of Gautama. The inhabitants of Sandoway town spend one day at this temple in March, June, and October of each year, spending the other days during which their feasts last at the pagodas of An-daw and Nan-daw.

Sandi.—*Parganá* in Bilgrám *tahsil*, Hardoi District, Oudh. Bounded on the north and west by *parganá* Báwan, Barwán, and Katiári; on the south-west and south by the Ganges and *parganá* Bilgrám; and on the east by *parganá* Bangar. The *parganá* is intersected by the Garra river from north to south, and the Rámangá flows irregularly along or near its western and south-western border. It is divided into two distinct portions by an irregular sandy ridge, which, running from north to south immediately to the east of Sandi town, marks the bank of an ancient channel of the Ganges, long since abandoned by the river in its gradual westward recession. All the villages on and to the east of this ridge are poor, uneven, and sandy. Irrigation is scanty and difficult. On the other hand, all the country to the west of the ridge, or about four-fifths of the

total area of the *parganá*, is a distinctly alluvial tract, levelled and enriched by the floods of three Himáláyan rivers, the Garra, Rámangá, and Ganges, and by minor streams such as the Sendha. All this tract is *turái*, that is to say, it has been scooped by fluvial action out of the adjacent *bangar* or original plateau; and in it the water level is always so near the surface, that in the dry months percolation largely supplies the want of irrigation, while in the rainy season it is more or less completely flooded. It constitutes, in fact, the flood basin of the three rivers named above. In heavy floods such as those of 1871, a sea of waters spreads from Sándi to Fatchgarh, 20 miles west. The rivers bring down a rich alluvial deposit locally called *seo*, which fertilizes the submerged fields and makes manuring unnecessary. The silt brought down by the Rámangá in heavy floods is sometimes spread 2 feet thick over the fields. Area, 168 square miles, of which 107 square miles are cultivated. Chief products—wheat, barley, rice, *bajra*, gram, *jodr*, and *arhar*. Population (1881) 72,830, namely, males 39,749, and females 33,081. Of the 141 villages in the *parganá*, 80½ are held by Rájputs, 26 by Muhammadans, 11½ by Bráhmans, 5½ by Lodhs, 4 by Káyasths, 1½ by Ahirs, and 12 by Government. *Tálukdári* tenure prevails in 30½ villages, *samindári* in 61½, and *pattidári* in 49. Government land revenue, £12,056; equal to an average of 3s. 6d. per cultivated acre, or 2s. 3d. per acre of total area.

Sándi.—Town and municipality in Hardoi District, Oudh, and headquarters of Sándi *parganá*; situated on the left bank of the Garra river, on the old route from Sháhjahánpur via Sháhábád to Lucknow. Lat. $27^{\circ} 17' 15''$ N., long. $79^{\circ} 59' 45''$ E. A considerable town, with a population (1881) of 9810, namely, Hindus, 6780, Muhammadans, 3022, and Christians, 8. Municipal income (1883–84), £471, of which £366 was derived from taxation; average incidence of taxation, 9d. per head. Sándi has a local reputation for the manufacture of a description of cotton carpets (*kalín*). Numerous handsome mosques and tombs of Muhammadan saints. A fine *sarái* or travellers' rest-house is situated in the market in the Nawábganj quarter of the town.

Sandila.—*Tahsíl* or Sub-division of Hardoi District, Oudh, lying between $26^{\circ} 53'$ and $27^{\circ} 21'$ N. lat., and between $80^{\circ} 18'$ and $80^{\circ} 52'$ E. long. Bounded on the north by Hardoi and Mirákh, on the east by Mahmudábád, on the south by Malihabád and Mohan, and on the west by Bilsgrám *tahsils*. Area, 557 square miles, of which 317 are cultivated. Population (1881) 250,406, namely, Hindus 225,496, and Muhammadans 24,910. Number of males, 132,372; females, 118,034; number of villages, 415; average density, 449 persons per square mile. This *tahsíl* comprises the four *pargánas* of Sandila, Kalyánmal, Balámau, and Gundwa. In 1883 it contained 4 civil and 6 criminal courts, including

a bench of Honorary Magistrates; number of police circles (*thánás*), 4; strength of regular and town police, 110 men; village watch or rural police (*chaukidárs*), 681.

Sandíla.—*Parganá* of Hardoi District, Oudh. Bounded on the north by Gopámau; on the east by Gundwa and Kalyánmal; on the south and south-west by Mohan, Aurás, Sasipur, and Bangarmau; and on the west by Bálamau and Mallanwán *parganá*s. A poorly wooded tract, with a large area of barren and sandy soil. Area, 329 square miles, of which 170 square miles are cultivated. Chief products—barley, wheat, *bádra*, gram, *arhar*, *mash*, and *joár*. At the time of the survey, barley occupied a fourth of the cultivated area; wheat a fifth; *bádra* and gram together, rather more than a fifth; while another fifth was under *arhar*, *mash*, *joár*, and rice. Other crops—cotton, sugar-cane, poppy, tobacco, and indigo. Population (1881) 151,440, namely, Hindus 130,910, and Muhammadans 20,530. Of the 213 villages comprising the *parganá*, 82 are held by Rájputs, 81 by Muhammadans, 41 by Káyasths, 5 by Bráhmans, 2 by Kurmís, and 1 each by Kalwárs and Lodhs. *Tálukdárí* tenure obtains in 114 villages, 70 are *zamindárí*, 26 imperfect *pattidárí*, and 3 *bháyáchára*. Government land revenue, £18,299; equal to an average of 3s. 4d. per cultivated acre, or 1s. 9d. per acre of total area. The principal landholding families are Sayyid Musalmáns.

Sandíla.—Town and municipality in Hardoi District, Oudh, and head-quarters of Sandíla *tahsíl* and *parganá*; situated 32 miles north-west of Lucknow, and 34 miles south-east of Hardoi town. Lat. 27° 4' 15" N., long. 80° 33' 20" E. The fourth largest town in Oudh, and the second largest in Hardoi District. Population (1881) 14,865, namely, males 7366, and females 7499. Muhammadans number 7487; Hindus, 7373; and Christians, 5. Municipal income (1883-84), £745, of which £724 was derived from taxation; average incidence of taxation, 11½d. per head of the population. The town contains the usual Sub-divisional civil and criminal courts, police station, dispensary, and Anglo-vernacular school. No buildings of special interest or antiquity. The *bára kambha* or hall of twelve pillars, a stone building, was erected about 150 years ago. Markets are held twice a week, at which *pán* and *ghí* are sold for export in considerable quantities. Station on the Oudh and Rohilkhand Railway. During the Mutiny, two severe actions were fought at Sandíla on the 6th and 7th October 1858.

Sandoway (*Than-dwaí*).—British District in the Arakan Division, Lower Burma. Area, 3667 square miles. Population (1881) 64,010 souls. Bounded on the north by the Maí river, separating it from Kyauk-pyu District; on the east by the Arakan Mountains; on the south by the Gwa river; and on the west by the Bay of Bengal. Its

extreme length is 136 miles; its breadth in the north 48, and in the south 24 miles. The administrative head-quarters are at SANDOWAY TOWN.

Physical Aspects.—Sandoway District is a mountainous country, the Arakan range sending out spurs which reach to the coast. These in their turn give off numerous sub-spurs, running for the most part parallel to the main chain. The surface configuration of the District is so disrupted by the influence of igneous action that not more than one-eighteenth of the area can be called plain; and except in this plain, and on the hillsides, where clearings are made for *taungya* or nomadic cultivation, the District is covered with dense forest. From the mouth of the Sandoway river northwards, the coast is indented with navigable and intercommunicating tidal creeks, by means of which communication can be kept up without going out to sea. Southwards, it presents a rugged and rocky barrier to the ocean, and has few available harbours. The rivers draining the District are but mountain torrents to within a few miles of the coast. The principal of these are—the Ma-i and the Tan-lwe, falling into the arm of the sea which divides Ranri island from the mainland; the Taung-gup (Toung-goop), which enters the Bay of Bengal by several mouths, between lat. $18^{\circ} 44'$ and $18^{\circ} 50'$ N.; the Sandoway, a tidal river, navigable by the largest boats as far as Sandoway town; the Gwa, which falls into the sea in about lat. $17^{\circ} 36'$ N., forming a good anchorage for steamers and vessels drawing from 9 to 10 feet of water, though the entrance is rendered difficult by rocks and a sandy bar.

The main range of the Arakan Yomas has in the north a direction south-east by south, but it gradually curves towards the west, and, at the source of the Gwa, runs nearly due north and south. In the north, some of the peaks attain an elevation of little less than 5000 feet, which falls to 3200 feet at Shauk-bin, where the Taung-gup road crosses the range. South of lat. $18^{\circ} 21' 26''$ N., the height rapidly diminishes, and at the sources of the Gwa is only about 890 feet. The chief pass is that from Taung-gup to Pa-daung on the Irawadi (Irrawaddy) in Prome District, a route followed by the main body of the Burmese in their invasion of Arakan in 1784, but found impracticable for troops or beasts of burden in 1825-26. Since then, the road has been considerably widened, and rendered fit for the passage of an armed force. It is now mostly used by traders from Pegu, and the telegraph line to Calcutta is carried along it. Another pass connects Gwa with Le-mjct-hna in Bassein.

The three most important timber-trees found in the District are—*pyin-gado* (*Xylia dolabriformis*), used in house-building and for railway sleepers; *in* (*Dipterocarpus tuberculatus*), and *La-gnyin* (*Dipterocarpus alatus*), from which are extracted resin and oil respectively. *Pyin-ma*

(*Lagerstroemia Flos-Reginæ*), *thin-gan* (*Hopea odorata*), *ka-gnyaung* (*Dipterocarpus turbinatus*), and many other trees abound. The low ground within tidal limits is covered with dense mangrove jungle. The area of reserved forest in 1883-84 was 307 square miles.

Owing to the wild and inaccessible character of the greater portion of Sandoway District, its geological structure has received very cursory examination. The existence of cretaceous rocks was first established in 1872. Mr. Theobald says that they extend down from Kyauk-pyu District, in lat. $29^{\circ} 30' N.$, certainly as far as Kyein-ta-lí in Sandoway, a distance of 94 miles. Limestone occurs about 4 miles south-south-west of Ma-lí, where it is quarried and burned for local use. The rock is argillaceous, very homogeneous in grain, and occasionally seamed with calcite. Other outcrops, also belonging to the cretaceous age, are found in various parts of the District. It is very probable that on examination, the formations in the plains would give evidence of frequent alterations of marine with fresh-water sediments. They certainly indicate nothing of the consolidation of older systems. Limestone, intermixed with the tertiary clays and sands of the lower lands, is abundant and very pure; yielding on analysis carbonate of lime (with traces of iron), 93.6 per cent.; insoluble clay, 6.4. Veins of steatite and white fibrous quartz also occur in the District.

History.—According to the palm-leaf chronicles, there reigned in Baranathi (Benares), at a time when the duration of human life was 90 millions of years, a descendant of the first Buddha of the present epoch, who had sixteen sons; to the eldest of whom, Tha-mú-tí-de-wa, was allotted the country now forming Sandoway District. For him the spirits or Nats built a city, Dwa-ra-wad-dí, near the modern Sandoway. Many ages later, Sek-kyá-wad-dí, the embryo Gautama Buddha, was King of Baranathi; and to his son, Kan-myin, he gave all the lands inhabited by the Burmese, Shan, and Malay races. Kan-myin came to Dwa-ra-wad-dí; dispossessed the descendant of Tha-mú-tí-de-wa; and was succeeded by kings of his own line, who ruled for a period represented by a unit followed by 140 ciphers. During the reign of Na-rein-da, the last of these monarchs, the country was attacked by the grandsons of a king who ruled in Mo-gaung.

The legend runs thus:—Arriving at the mouth of the Than-dwe (Sandoway) river, they failed in their attempts to find the city, owing to the devices of its guardian Bí-lú-ma, or, as some say, to its miraculous power of soaring above the earth in times of danger. At length the guardian, being propitiated, withdrew her protection; and the ten brothers then bound the city to the earth with an iron chain, and divided their conquest in ten shares, making Than-dwe ('iron-bound') their capital. But the eight younger brothers were slain in combat with the people, who appear to have risen against them, and the two elder fled.

Henceforth Sandoway appears only as a province of the Arakan kingdom, ravaged alternately by the Burmese and Talaings until the conquest of Arakan by the Burmese in 1784. It was then formed into a governorship, and its *town* was one of the commanders of the Burmese army which invaded Bengal at the commencement of the first Anglo-Burmese war. The country was ceded to the British by the treaty of Yandabu in 1826; and on the withdrawal of General Morrison's army, one regiment of Native infantry was left at Sandoway. A few years later, the military head-quarters were transferred to Kyauk-pyu, and subsequently the small detachment of two companies was also withdrawn.

Antiquities.—On the hills close to Sandoway are three small white-washed pagodas, the An-daw, Nan-daw, and San-daw. The An-daw is said to have been erected in 761 A.D. by King Min-tsek-kyup, to cover a tooth of Gautama. The building is 242 feet in circumference and 63 feet high. The Nan-daw stands on a hill 480 feet above the level of the plain, and is 38 feet high; it is said to have been built in 763 A.D. by Min-bra, to enshrine a rib of Gautama. The San-daw is assigned to Min-nyo-khin (784 A.D.), and covers a hair of Gautama brought from Ceylon. Three times a year pilgrims resort to these pagodas, remaining one day at each temple on each occasion. Two stones inscribed in Sanskrit of the 8th century have been found near the Sandoway river. Silver coins struck by ancient kings of Arakan are occasionally met with, some of which have the dates and names in Burmese characters, whilst others bear Persian or Nagari inscriptions. Celts or stone implements are abundant.

Population.—Mountainous and forest-clad, Sandoway District seems to have been always sparsely inhabited, but the increase of population since the British occupation has been proportionately larger than in other parts of Arakan. In 1828, the number of inhabitants was 19,538; by 1852, it had risen to 42,886; in 1872, to 54,725; and in 1881, to 64,010, namely, males 32,706, and females 31,304. Number of villages, 469; occupied houses, 11,639, unoccupied houses, 773; average density of population, 17.66 persons per square mile. Classified according to age, there were—under 15 years, boys 14,058, and girls 13,486; total children, 27,544, or 43 per cent. of the population: 15 years and upwards, males 18,648, and females 17,818; total adults, 36,466, or 57 per cent. of the population.

Buddhists number 56,458; Nat-worshippers, or persons of non-Buddhist indigenous religion, 4888; Muhammadans, 2509; Hindus, 124; and Christians, 31. Taken by language—persons speaking Burmese (including Arakanese) numbered 58,061; Chin, 5045; Karen, 107; Shan, 59; Bengali, 399; Hindustani, 263; and a very few speaking English, Greek, Chinese, Tamil, Telugu, and Manipuri.

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The Muhammadans are of two classes. The Me-du, who ascribe their origin to members of a colony from near Ava, who originally came as soldiers with the invading Burman army, and who, about 70 or more years ago, were joined by many of their co-religionists who left Burma during a famine. The Kaman, who claim to have come originally from Delhi, and to be descended from the followers of the unfortunate Sháh Shujá, who was put to death by the King of Arakan, with whom he had sought refuge from his brother Aurangzeb. Neither of these classes differ much from their Buddhist neighbours, except in religion and education, of which they have less. The Hindus are mainly convicts transported from India many years ago, when Sandoway was a convict station. Chin, a race of mountaineers, have long inhabited the north and east, and of late years have spread into the plains. See article THAYET-MYO.

There is (1881) no town in the District with more than 2000 inhabitants, and by far the greater number of villages, namely, 381, have fewer than 200; 80 only having from 200 to 500; 6 from 500 to 1000; and 1 from 1000 to 2000 inhabitants. These are nearly all situated between the sea-coast and the slopes of the Arakan Yomas. The chief places in the District are—SANDOWAY, the administrative head-quarters, situated on the Sandoway river, and containing the usual public buildings; population (1881) 1901; TAUNG-GUP, on the Taung-gup river, and head-quarters of a township; population 1778; GWA, a trading village, with a population of 1072; KYEIN-TA-LI, a small village at the mouth of the river of the same name.

Agriculture.—Of the total area of the District, namely, 3667 square miles, only 60 square miles were returned in 1883-84 as cultivable, and about 75 as under actual cultivation. In 1881, the total agricultural population numbered 53,662, or 83·83 per cent. of the District population. Total amount of Government assessment, including local rates and cesses on land, £6441, or an average of 2s. 9½d. per cultivated acre. The chief crops are rice, sesamum, tobacco, cotton, pepper, sugar-cane, *dhani* palms, and yams. In 1883-84, the area under the various crops was as follows:—Rice, 36,754 acres; oil-seeds, 981; sugar-cane, 1044; cotton, 336; vegetables, 292; *dhani* palms, 2355; tobacco, 1874; plantains, 664; mixed fruit-trees, 606; chillies, 320; *taungya*, or hill gardens, 3986; miscellaneous crops, 896. Land suited for rice yields on an average 940 lbs. per acre; cotton, 480 lbs.; oil-seeds, 400 lbs.; sugar, 1040 lbs.; tobacco, 400 lbs.; and chillies, 240 lbs. Sesamum and cotton are grown principally with rice in *taungya* or hill gardens. The cultivation of tobacco is extending; the best is grown on the alluvial soil deposited during the south-west monsoon by the torrents of the Yoma range in their short course to the sea. The Cuba plant was introduced by Captain (now Sir A. P.) Phayre and Captain (now

Lieutenant-General) Fytche, and thrives well ; but is considered by the natives inferior in flavour to their own tobacco, which is said to have been originally brought from China. Madder is produced near the Gwa, and the cultivation is very profitable ; it is exported to Bassein.

As an almost universal rule, the land in the plains is held by small proprietors directly from the State ; the average size of the holdings is 5 acres. In 1883-84, the average rent of land suited for rice was 7s. an acre ; oil-seeds, sugar, cotton, tobacco, and chillies, 3s. 3d. Land is not often mortgaged, but very high interest is charged for loans. If a large amount is required, the land is generally made over to the mortgagee for several years on the payment of a lump sum, for which no other interest is charged. Labourers engaged for ploughing receive 2 rupees, or 4s., per acre and their food ; and when hired for transplanting or reaping, a bushel of grain per diem. When land is leased the rent is almost invariably paid in kind, and averages one-third of the yield. In 1883-84, the average prices per *maund* of 80 lbs. were—cotton, 12s. ; rice, 5s. ; sugar, 8s. ; salt, 2s. 3d. ; tobacco, £1, 8s. ; oil-seeds, 8s. ; chillies, 24s. ; plough bullocks, £3, 10s. each, sheep and goats, £1 each ; buffaloes, £4, 10s. The wages of skilled labour were from 1s. to 1s. 6d., and of unskilled labour, 9d. a day. In 1883-84, the agricultural stock and implements consisted of—Cows and bullocks, 11,777 ; buffaloes, 25,147, pigs, 2355 ; sheep and goats, 484 ; horses and ponies, 32 ; elephants, 7 ; ploughs, 14,592, carts, 790, boats, 1692.

Manufactures, etc.—The most important manufacture is thatch from the leaves of the *dhani* (Nipa) palm, which is in great demand in Akyab and Kyauk-pyu, as well as locally. Cotton cloth and silk dresses are woven by the women in almost every house. The silk used is obtained from the southern township, where silk-worms are bred, and from the valley of the Irawadi. There is a large export trade with Akyab, Kyauk-pyu, and Bassein in rice, tobacco, sesamum, plantains, salt, salt-fish, *nga-pl* or fish paste, and boats. The imports consist of piece-goods, cotton twist, betel-nuts, crockery, and hardware. In 1883-84, the total length of water communication in Sandoway District was 130 miles ; of roads, 20½ miles.

Administration.—Under Burmese rule, the regular revenue was derived from transit dues, a poll tax, and a tax on land. Five baskets (each holding 40 lbs.) of rice in the husk were taken for each pair of buffaloes used, and half a basket was claimed by the keeper of the royal granary as 'wastage.' But there was no fixed rate, and the governors often exacted more. In 1828, it was calculated that every head of a family paid £1, 15s. a year to the Government, whilst the annual cost of living for four persons was only £4, 4s. In 1851, the revenue amounted to £8362 ; in 1871, to £11,744, including local funds. In 1877-78, the imperial revenue was £14,423, of which £5685 was land revenue ;

the local revenue was £580. The incidence of taxation of all kinds was 3s. 0½d. per head. In 1883-84, the gross revenue was £13,978, of which £6749 was land revenue. In Burmese times, the country was administered by a *wun* or governor, under whom were the *sit-ke*, *myo-uk thugyi*, and other subordinates. It appears from the records at Sandoway that the *thugyi* generally levied their demands thus:—From married people, well off, with families, bond servants, cattle, etc., £1, 14s.; married people not so well off, £1, 10s.; married people dependent upon their own labour, or too old for work, and newly married people with means, 18s.; newly married people with little or no substance, 7s. *Pingyi*s (priests), the maimed and infirm, Government servants, and bachelors, were exempt from taxation.

For some time after the British occupation, the country was in a disturbed state. It has now settled down into a peaceful District, administered by a Deputy Commissioner with extensive judicial powers, who is the chief revenue authority under the Commissioner of the Division. Under him are the extra-Assistant Commissioners. The regular police consisted in 1883-84 of 196 officers and men, or about 1 policeman to every 18 square miles or every 327 inhabitants. There is a jail at Sandoway town; the daily average of prisoners in 1883 was 15. The total cost was £419. The hospital and civil dispensary, also at the head-quarters town, gave relief in 1883 to 83 in-door and 5889 out-door patients. Little education has, till lately, been given except by the Buddhist monks. The Census of 1881 showed 2371 boys and 83 girls as under instruction, besides 9051 males and 105 females able to read and write, but not under instruction. The Muhammadans were still more backward; in towns the children are better instructed, and in some cases learn both Arabic and Hindustani. A middle-class school was opened in 1876, and had 44 pupils on the rolls at the end of the year, and 116 in 1883-84. Total number of schools in 1883-84 under public management, indigenous and private, 20; number of scholars, 683.

Climate.—From November to February the dews are exceedingly heavy, and the nights very chilly, the terrestrial radiation thermometer often recording only 38° F. From February to May, dense fogs rise during the evenings, and the wind blows from the west. Towards the middle of May, storms of thunder and lightning are of frequent occurrence. The average rainfall registered for the twenty years ending 1881 was 212·02 inches. Total rainfall in 1883, 223·18 inches. The maximum temperature was 103° F., and the minimum 61° F. The town of Sandoway is considered by some to be the healthiest place in Arakan. The prevalent diseases of the District are agues and fevers. [For further information regarding Sandoway, see the *British Burma Gazetteer*, compiled by authority, vol. II. pp. 606-626; the *British*

Burma Census Report for 1881; and the several Administration and Departmental Reports of the Government of Burma.]

Sandoway.—Chief town and head-quarters of Sandoway District, Arakan Division, Lower Burma; situated in lat. $18^{\circ} 27' 35''$ N., and long. $94^{\circ} 24' 36''$ E., on the Sandoway river, about 15 miles from its mouth, but only $4\frac{1}{2}$ miles from the sea in a direct line. The town lies in a basin about 12 miles long by 1 broad, which is cultivated with rice, and surrounded by hills, the only outlets being those through which the river flows. The larger portion of the town, which is laid out regularly, lies on the left bank of the river; whilst on the right side is a long straggling suburb, buried in trees, and presenting the appearance of an independent village. It contains the court-houses, police station, market, jail, hospital, dispensary, and circuit-house.

Sandoway is a very ancient town, and is often mentioned in Arakanese history as the capital of a kingdom, or more probably a petty chieftainship. Its original name was Dwa-ra-wad-dl; but according to a current legend it was called Than-dwe (by which appellation it is now known to the Burmese and Arakanese, Sandoway being an English corruption), from its having been miraculously fastened to the earth by iron chains.

After the capture of Arakan town in 1824, a force was sent southwards to attack Ramri and Sandoway. General MacBean reached Sandoway on the 30th of April, and occupied the town without resistance. After the cessation of the war, it remained for some years the head-quarters of the troops garrisoning Arakan. The garrison has now been altogether withdrawn. When the British first took the town the number of inhabitants was found to be 4500. In 1877-78, the population was returned at 1617; and in 1881, 1901.

Sandoway carries on a small coasting trade in rice, vegetables, etc., and a land traffic in silk and other piece-goods with Prome and Bassein over the Arakan Mountains valued at £2000 per annum. Owing to the numerous creeks intersecting the coast, boats can get as far as Akyab without entering the open sea. In the neighbourhood of Sandoway are the three pagodas of An-daw, Nan-daw, and San-daw, to which pilgrims resort three times a year, spending one day on each occasion at each shrine.

Sandoway.—River in Sandoway District, Arakan Division, Lower Burma. It rises in the Arakan Hills, and, flowing west-north-west, falls into the sea in about lat. $18^{\circ} 31'$ N. About 15 miles up the river is Sandoway town, which can be reached by large boats. The anchorage inside the mouth is from 5 to 6 fathoms; the tide is felt for a short distance above Sandoway town. About 50 miles from the entrance is a sulphuretted hydrogen spring in the bed of the river, the water of which attains a heat of 110° F.

Sandoway Myoma.—Township in Sandoway District, Lower Burma, sometimes called the central township. Bounded on the west by the Bay of Bengal. It comprises 14 revenue circles; chief town, SANDOWAY, on the Sandoway river. In 1881, the cultivated area was 20,667 acres; products—rice, tobacco, sesamum, cotton, pepper, sugarcane, cocoa-nuts, hemp, and miscellaneous garden stuff. Exports—agricultural produce; imports—European cotton and woollen goods, silk goods from Prome and Bassein, and earth-oil and lacquered ware from the latter District. Good communication by boat.

Sandru.—Pass in Bashahr (Bussahr) State, Punjab, across the Himálayan range in Kunáwar. Lat. $31^{\circ} 24' N$, long. $78^{\circ} 2' E$. (Thornton). Said to be open during only two months of the year. Elevation above sea-level, about 16,000 feet.

Sandúr (*Sundoor*, *Sandhur*?).—Native State within the British District of Bellary, Madras Presidency, lying between $14^{\circ} 58'$ and $15^{\circ} 12' N$ lat., and between $76^{\circ} 28'$ and $76^{\circ} 43' E$ long. Area, 164 square miles, of which a large proportion is hill jungle. The State is bounded on the south by the Kúdligi *táluk*, and on all other sides, save a small portion bordering on Mysore State, by the Hospet *táluk* of Bellary District. The tract is elliptical in shape, stretching from north-west to south-east, and is almost entirely shut in by hills, which isolate it from the neighbouring country. Population of the State (1881) 10,532. The annual revenue from all sources somewhat exceeds £4500.

Physical Aspects.—One chain of hills on the western limits of the State is known as the Sandúr or RAMANDRUG range (*q.v.*); and from the north, the Timmappa Hills run down to form its eastern boundary. These are crossed by three principal passes. On the east, the Yettinhatti or Bhimagandi *ghát* connects the State with Bellary; on the south-west, through the Oblagandi gorge, runs an excellent cart-road for through traffic. The Rámangandi valley between the two main converging ranges is the northern entrance, and has a good road to Hospet. The principal elevations are the Rámandrug, Kumáraswámi, and Kombatharavu plateaux. All these attain an elevation of about 3000 feet. The sides of the hills are in most places forest-clad, but indiscriminate felling and charcoal-burning have done much to keep down the more valuable timbers.

Several streams water the State. These, for the most part, find an outlet in the Sandúr river or Nári Nálá through the Yettinhatti gorge, and feed the Daroji tank in Hospet. On the hills, tigers, leopards, hogs, porcupines, bears, *sámbhar* deer, and jungle sheep are found. The prevailing rock is a chloritic slate, often highly impregnated with oxide of iron, and crested in many places with mural ridges of ferruginous quartz rock, tinted with a variety of colours, from a steel-grey to a deep

liver-brown. This rock often forms whole hillocks, always, however, overlying the slate. On the hills generally, iron-ore is obtained. It is often of a rich quality, easily got at, and usually of a friable description. On Rámadrug, various coloured clays are procurable without difficulty. The prevailing soil in the valley is a rich heavy loam, interspersed here and there with patches of black cotton-soil. In various parts, lime is obtained near the surface, chiefly in nodular form. The ascent to the Kumáraswámi pagoda passes over an extensive bed of lava conglomerate; and the same feature characterizes part of the Ramandrug range.

History. — The founder of the Sandúr family was a Maráthá named Malaji Ráo Ghorpae, an officer in the Bijápur army, whose son Biráji entered the service of Sivaji the Great. The State had been previously held by a Bidar Poligár, but Biráji's son Sidaji took Sandúr from the Bedars, and his conquest was confirmed to him and his heirs by Sambhaji, the successor of Sivaji. Sidaji died in 1715, and was succeeded in Sandúr by his second son, Gopál Ráo, whose fate is involved in obscurity. All that is known is, that Sandúr was taken by Haidar Ali some time after his capture of Gooty (Guti) in 1779; that Haidar began, and Tipú completed, the fort, and that Gopál Ráo's son, Siva Ráo, was killed in battle in 1785, in a vain attempt to recover his patrimony.

In 1790, Siva Ráo's brother, Venkat Ráo, acting on behalf of his nephew Sidaji, expelled Tipú's garrison, but did not attempt to occupy Sandúr till the fall of Seringapatam. The Peshwá then claimed the State as his own, and presented it to Yaswant Ráo Ghorpae, a distinguished officer of Sindhia's army, who belonged to the same family as the former holders. Yaswant Ráo did not enter into possession, and the widow of Sidaji, who died in 1796, adopted Siva Ráo, a son of Khandi Ráo, the younger brother of Yaswant Ráo. The Peshwá made an unsuccessful attempt upon Sandúr in 1815, and at his request in 1817, the British Government, in conformity with the provisions of the treaty of Bassein, sent a force under Sir Thomas Munro to reduce it. In October of that year, the fort and State were surrendered. On Sir Thomas Munro's recommendation, Siva Rao received as compensation a *jágir* of £1000.

In 1818, however, after the downfall of the Peshwá's Government, Siva Ráo was restored to his State; and in 1826 he received a *sanad* from Government confirming the lands of Sandúr to him and his heirs free of any pecuniary demands. Siva Ráo was succeeded in 1840 by a nephew named Venkat Ráo, who died in 1861. His eldest son, Siva Shan Mukha Ráo, being then a minor, did not receive the *sanad* till 1863. On the 24th January 1876, Lord Northbrook, then Governor-General, conferred on him the title of Rajá, as a hereditary distinction

to be assumed by his successors on formal recognition of their succession. Siva Shan Mukha Ráo died in May 1878, and was succeeded by his half-brother Rám Chendra Vittala Ráo, the present Rájá, to whom the *sanad* was granted in February 1879. The Rájá has the entire management of the revenue and police of his State, and the duty of administering civil justice. In the administration of criminal justice, he is required to refer all cases calling for capital punishment for the orders of the Madras Government. The Collector of Bellary acts as Government Agent. The chief holds a *sanad* conferring rights of adoption, granted by the British Government.

In the office of the Agent of the Rájá at Sandúr is a copper-plate document evidencing the grant of land in *indm* to village carpenters, and the building of villages by a 'Narpati' king.

Population.—The population of Sandúr State in 1865 was 12,962. At the Census of 1871 it was returned as 14,994; and the Madras Administration Report for 1877-78 gives the number as 14,999. It is probable that this estimate was considerably in excess of the actual population, as the Census was taken a few days previous to the Kumáraswámi festival, when there was a considerable influx of strangers. The Census of 1881 gives the population as 10,532. The decrease of nearly 30 per cent. since 1871 is due to the loss caused by death and emigration during the famine of 1876-78, and the subsequent removal of the military depôt from Rámandrug. According to the Census of 1881, males numbered 5298, and females 5234, occupying 2173 houses in 23 villages. Hindus numbered 9000; Muhammadans, 1521; and Christians, 11. In caste and race, the people are identical with those of the surrounding District of Bellary. On the plateaux there is a hill tribe of hunters, called Bedars, divided into two clans. They are a healthy and industrious people; and although possessing peculiar customs, they are probably Dravidian Hindus, and in no way connected with the aboriginal tribes, such as Malayális, etc.

Places of Interest.—The two places of most interest in the State are the important sanatorium of RAMANMALAI, situated 3150 feet above the sea, and used chiefly as a convalescent depôt for troops; and the temple of Kumáraswámi, of which Newbold gives the following description:—"It is situated near the basin of a ravine, not far from the summit of the south-west part of the range of hills that enclose the valley; and after an ascent of 4 miles. The temple is neither large nor magnificent, but has an air of antiquity, of which its whitewashed exterior and gilded cupola cannot entirely divest it. The *gopuram* faces the east; on the left of the entrance is the shrine of the goddess Párvati, consort of Siva; to the west is the image of her son Kumáraswámi, the presiding genius of the place; and to the right stands the shrine of the destroyer Siva. In front is a square pool called "Aguste

Tirtha." In front of the *gopuram* is a small octangular column of hewn stone, at the foot of which lie three trunkless stone heads. The largest is that of the giant Tarakasam, slain by Kumáraswámi. The great festival occurs triennially, and at this the number of pilgrims has latterly amounted to 25,000 or 30,000; the temple revenue averages from 15,000 to 20,000 rupees (say £1500 to £2000) annually. A *Shasanam* in old Kanarese is still preserved, which grants the endowment of the temple. It was given in S. 615 (713 A.D.) by a king of the Marala dynasty, named Bijala Náyak.' The climate of Kumáraswámi is described as very agreeable, although, owing to its easterly position, it is not so cool as that of Rámandrug.

Revenue.—The revenue of the State is at present about £3700, of which £1800 is derived from land. The land revenue includes grants of land to dependants and service lands; other lands to the annual value of £1300 are alienated. It has been the policy of the present Rájá to increase the security of the land tenures, and render them permanent. The peasants may cut wood for all agricultural purposes free of payment; nor are they liable to be charged for firewood which they themselves carry home. The poorer classes were formerly permitted to cut firewood and grass in the jungles, and to sell it in the *bázár* free of tax, but under recent regulations each head-load of firewood brought for sale is subject to a tax of 3 *pies* (or $\frac{3}{8}$ d.). In 1882, an arrangement was entered into between the Rájá and the Government, according to which 40,000 acres of forest land were leased to the latter for 25 years at 4 *annas* (6d.) per acre per annum, reserving to Government the option of renewing the lease on the same terms at the end of that period, and every succeeding period of 25 years.

The average annual rainfall of Sandúr is about 36 inches. The chief village is Sandúr; population (1881) 4096, occupying 793 houses.

Sandúr (*Sundoor*, or more properly *Rámandrug*).—Hills in Bellary District, Madras. A range of hills about 15 miles long, running from south-east to north-west, ending abruptly near Hospet. This range forms the greater part of the western boundary of the Native State of SANDUR, dividing it from the Hospet *taluk*. Rámandrug, 3150 feet above the sea, is the principal peak, and was selected as far back as 1846 for the sanitarium of RAMANMALAI. The range consists of gneiss much weathered. The upper part of Rámandrug is clay ironstone, and the slopes consist of a variety of schistose rocks containing manganese and antimony. Tigers are found in these hills, and much useful wood comes from them.

Sandwip (*Sunderp*).—Island in the Bay of Bengal; situated off the coast of Chittagong and Noákháli, and forming part of the latter District. Lat. $22^{\circ} 24'$ to $22^{\circ} 37'$ N., long. $91^{\circ} 22'$ to $91^{\circ} 35'$ E. The largest of many *chars* formed by the MEGHNA as it enters the sea. For long, a process

of diluvion went on in the south of Sandwíp, but the soil re-formed and reappeared in 1865 as the Kálí *char*, many miles long, lying parallel with the south face of the island, at a distance of 2 or 3 miles. This *char* already acts as a bar to protect Sandwíp from further diluvion, and will eventually, in all probability, become attached to it by the silting up of the intermediate channel.

Sandwíp early attracted the notice of travellers. Cæsar Frederick, the Venetian (1565), described the inhabitants as 'Moors;' and stated that the island was one of the most fertile places in the country, densely populated, and well cultivated. He mentions the extraordinary cheapness of provisions; and adds that 200 ships were laden yearly with salt, and that such was the abundance of materials for shipbuilding, that the Sultan of Constantinople found it cheaper to have his vessels built here than at Alexandria. Purchas (*arc.* 1620) states that most of the inhabitants near the shore were Muhammadans; and there are several mosques on Sandwíp Island two hundred years old. Sir Thomas Herbert (*arc.* 1625) bears testimony to the fertility of the island, which he describes as one of the fairest and most fruitful spots in all India. The cocoa-nut palm flourishes in Sandwíp, and the nuts are exported to Chittagong and Akyab. Sugar-cane is also cultivated to a small extent.

The island of Sandwíp figured conspicuously in the contests of the 17th century between the Arakanese, Muhammadans, and Portuguese (see CHITTAGONG DISTRICT), and during that period numerous forts were erected. In one of these, the Muhammadan troops took refuge in March 1609, when the Portuguese landed on the island. But the fort was besieged and captured, and the defenders put to the sword. In 1616, Sandwíp was taken from the Portuguese by the Arakanese. In 1665, Sháístá Khán, the Muhammadan Nawáb of Bengal, determined to reconquer the island. An interesting account of his expedition, by the French traveller Bernier, was translated in the *Calcutta Review* for 1871, and is quoted in *The Statistical Account of Bengal*, vol. vi. pp. 243-246.

Until 1822, the island formed part of Chittagong, but in that year it was made over to the newly formed District of Noákhálf. It had, from the time when it came under British administration (1760), formed a constant source of disquiet. It afforded an asylum for the refuse of the river Districts from Dacca southwards, and had a mixed population of Hindus, Muhammadans, and Maghs, who formed agricultural colonies, fishing settlements, piratical villages, and robber communities. The subordinate tenants kept up a bitter quarrel with the landholder-in-chief, and every class seemed to have a grudge against the rest, and some complaint to make to Government. But the firm administration of the British officials gradually produced its

effect. A Commissioner was appointed to measure and partition the island. His appearance, however, was at first only the signal for new disorders. On the one hand, he complained of 'obstructions and difficulties' thrown in the way of executing his duty; on the other hand, the *Mukdars* forwarded a bitter petition and lament. An enterprising native gentleman proposed, in May 1785, to relieve the officials of further difficulty by taking Sandwip in farm. But the Government was resolved to have the work thoroughly done, and rejected his offer. Accordingly, the troublesome island was placed under the direct management of the Collector, who was ordered to conduct a land settlement.

The administration of justice in Sandwip was formerly under the authority of an officer called a *faujdar*, resident in the island. But from a Report (dated September 1779) by Mr. Duncan, specially deputed to Sandwip, it appears that when Government ceased to maintain a fortress on the island, the *faujdar* was no longer retained, and justice was administered by an inferior officer with the title of *darogá*. This official had not, however, uncontrolled jurisdiction. From the year 1760, if not from an earlier date, he was entirely under the authority of the *naib ahad-dár*. It was the duty of the *darogá* and his assistants to prepare cases for hearing; and on fixed days in each week the *naib ahad-dár* would sit in his court of justice, attended by the *darogás*, *kánungos*, and *zamindárs*, to dispose of all cases brought before him. 'This court,' writes Mr. Duncan, 'took cognizance of all matters, civil and criminal—its jurisdiction being only restrained as to matters of revenue, the cognizance of which rested with the *ahad-dár* in his separate capacity. In matters of debt, the court retained the fourth part of the sum in litigation, and enacted discretionary fines for theft, gang-robbery (*dhakáiti*), fornication, assaults, and the like.'

Among the miscellaneous inquiries conducted by Mr. Duncan in 1779, was one relating to complaints of slaves, or persons reported to be slaves, against their masters. 'This unfortunate race of mankind,' says Mr. Duncan, 'bears in Sandwip a larger proportion to the other inhabitants than perhaps in any other District in the Province; there is hardly a householder, however indigent, who has not at least one slave, and the majority have many in their families. Their number also very soon increases by marriage, in which they are encouraged by their masters, the custom of the country being such that a free woman, on marrying a male slave, reduces herself and her family to be the perpetual slaves of her husband's master, who continues ever after to retain them in the same bondage.' One man alone was said to possess more than 1500 slaves. The principal cause assigned by Mr. Duncan for the great extent to which slavery prevailed in Sandwip, was 'the extreme cheapness and abundance of grain in

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the island, so that as often as there is any scarcity in Dacca District, it attracts people to Sandwip, where it has been common for many of them to sell themselves and their posterity for maintenance.' Although Mr. Duncan in 1779 set at liberty only 15 slaves and their families, yet none of his proceedings created more general apprehension than his taking cognizance of this particular grievance, because all the principal people were immediately interested.

From its low-lying position, Sandwip is peculiarly exposed to inundation from storm-waves, and suffered severely in loss of life and property by the cyclones of 1864 and 1876. The calamity of the latter year was the severest on record. The following account of the inundation is quoted from a report by Mr. Pellew, the Collector of Noákháli:—'The people in the villages on the south-western coast stated that the inundation commenced with a wave at least 6 feet high, which burst over the land from the south-east. Very shortly afterwards, another wave, 6 feet higher, came from the south-west. These waves came suddenly, just like the bore, mounting up and curling over. The second wave is described as lifting the roofs of the houses, and whirling the contents—human beings, furniture, etc.—violently outside. The mat walls, with their wooden posts, were swept away, the latter being either broken off short or wrested out of the ground. All this was done suddenly; people described it as occurring in one second of time. Behind each wave the water did not fall again, but remained, so that after the second wave there was 12 feet of water over the land.

'In the centre of the island the water came up less suddenly. The Government Pleader at Harishpur was taking refuge from the storm in his new office. Suddenly an alarm was raised that the water was coming. He got on the wooden dais, but the water immediately covered this. He then went up to his neck in water, along a raised path, to the bank of his tank, which is about 12 feet high. He told me that the rising of the water did not take longer than two minutes from first to last, and that he was only just in time. The bank of the tank was not more than 10 yards from his office.'

In many villages whole families were swept away, and in some of the *chars* the entire population was destroyed. 'In the village of Nayámastí,' writes Mr. Pellew, 'one man was the sole survivor of thirteen; four men were the survivors of a household of twenty-five. The women have perished in immense numbers. Most of the men who remain are wifeless. In Kangáli Char, the Sub-Inspector of Police found nothing but two wild buffaloes alive, and the corpses of men, cows, and buffaloes. In Char Maulavi, out of 177 people, 137 died.'

For the first few days after this cyclone of 1876, there were several

attempts at plundering, and demoralization prevailed among the low Muhammadan population. Men, in gangs and singly, armed with cudgels, bills, and hatchets, were, the Collector reported, wandering about the inundated tracts, and breaking open and looting all they could lay their hands upon, whether under the care of owners or not. This lawlessness was, however, rapidly suppressed; and the people soon returned to the sites of their former houses, and busied themselves in drying their grain and in saving what they could of their property. Throughout the devastated tracts, 'the demeanour of those who really bore the brunt of the storm was,' Sir Richard Temple states, 'marked by that enduring fortitude under suffering which distinguishes the native character.'

The number of deaths was officially estimated at 40,000, out of a total population of 87,016. Cholera set in soon after the cyclone had passed over. Although a large medical staff was immediately despatched to the District, the epidemic continued to rage to such an extent, that when Mr. Pellew visited the Sandwip islands, the mortality from the plague threatened in some places to exceed that from the storm itself. The returns for thirty-three police-beats in South Sandwip, with a population of 10,855 souls, gave the deaths by drowning as 1063, whereas those from cholera in the same tract had by December 1876 amounted to 764. The pollution of the tanks and watercourses, both by the salt-water inundation and by the corpses of men and the carcases of cattle, added to the other evils resulting from the cyclone; while the stench from the dead tainting the air throughout the inundated tract aggravated the plague of cholera. Nearly all the scavenger animals—jackals, dogs, and even vultures—perished by the storm and the wave; and for weeks after the inundation, the land was covered with the dead bodies of men and cattle, preserved by the salt-water from rapid decomposition. The total population of Sandwip Island in 1881 was returned at 72,467, showing a decrease since 1872 of 14,549, or 16.72 per cent.

Sangakherá.—Village in Hoshangábád *tahsil*, Hoshangábád District, Central Provinces. Population (1881) 2957, namely, Hindus, 2592; Muhammadans, 118; and non-Hindu aborigines, 247.

Sangala.—Ruins in Jhang District, Punjab; standing on a small rocky hill, upon the border of Gujránwála District; now known as Sanglawála Tiba, and identified by General Cunningham with the Sákala of the Bráhmans, the Ságala of Buddhism, and the Sangala of Alexander's historians. The hill rises to a height of 215 feet above the surrounding plain on its north side, and slopes southward till it ends in an abrupt bank only 32 feet in height, crowned in early times by a brick wall, traces of which still exist. The whole intervening area is strewn with large antique bricks, great quantities of which have

been removed during recent years. An extensive swamp covers the approach on the south and east, the least defensible quarters, with a general depth of 3 feet in the rains, but dry during the summer. This must have been a large lake in the days of Alexander, which has since silted up by detritus from the hill above. On the north-east side of the hill, General Cunningham found the remains of two considerable buildings, with bricks of enormous size. Close by, stands an old well, lately cleared out by wandering tribes. On the north-west side, about 1000 feet distant, rises a low ridge of rock, known as Munda-ka-pura, 30 feet in height, also covered by brick remains.

The earliest notice of the locality occurs in the *Mahābhārata*, where Sākala figures as the capital of the Mādras or Jātakas, and the Bāhikas, situated upon the Apagā rivulet, west of the Irāvati or Rāvi, and approached from the east by pleasant paths through the Pīlu forest. The neighbourhood bears the name of Mādra-des, or country of the Mādras, to the present day. The Apagā rivulet has been identified by General Cunningham with the Ayak *nadi*, a small stream which has its rise in the Jāmmu hills north-east of Siālkot, but which is now quite dry in the neighbourhood of Sāngala.

In Buddhist legends, the city reappears as Sāgal, whither seven kings made their way to carry off Prabhāvatī, the wife of King Kusa. That monarch, however, met them outside the gates, mounted upon an elephant, and shouted with so loud a voice that his words were heard over the whole world, and the seven kings fled away in terror. Arrian, Curtius, and Diodorus all notice Sāngala, 'a great city, defended not only by a wall, but by a swamp,' which was deep enough to drown several of the inhabitants who attempted to swim across. Alexander seems to have turned out of his direct line of march to punish the Kathæans of Sāngala, who had withheld their allegiance. He stormed the outpost of Munda-ka-pura, crowded with fugitives from other cities, and then, breaching the walls by means of a mine, captured the town by assault. Hiuen Tsiang, the Chinese Buddhist pilgrim, who visited Sākala in 630 A.D., found the fortifications in ruins, but traced their foundations for a circuit of $3\frac{1}{2}$ miles. In the midst of the remains, a small portion of the ancient city, 1 mile in circuit, was still inhabited, and contained a Buddhist monastery with 100 monks, and two *stupas*, one of them founded by the famous Emperor Asoka. The accurate details of the Chinese traveller have been principally instrumental in settling the identity of Sānglawāla Tiba with the historical site.

Sangam.—Anicut and village in Nellore District, Madras Presidency; situated on the Penner river, 38 miles from the sea and 20 miles above the anicut at Nellore town. The object of the anicut is to extend irrigation along the northern bank of the Penner, commanding an area of 220 square miles. This tract of country already contains many

tanks, and is partially irrigated by cuts from the Penner. The construction of the anicut will render certain the existing irrigation, and will largely increase it. Present irrigation, 44,053 acres; estimated increase, 49,947 acres; total, 94,000 acres. From the anicut, a main channel, leading from a head sluice on the north bank of the river, will supply two large existing reservoirs, namely the Kanigiri and Duvur tanks. From the former, the irrigation channels will be taken off.

When finished, the anicut will be 4290 feet in length, or nearly three times the length of the Penner anicut at Nellore. Its crest will be 7 feet above the deep bed of the river, or 105 feet above mean sea-level. The head sluice (which was finished in 1884) has 21 vents of 6 feet span, and is designed to carry 4800 cubic feet of water per second (when the water in the river is flush with the anicut crest). The water will be distributed in the following proportion to the reservoirs:—Kanigiri tank, cubic feet per second, 4576·5; Duvur tank, cubic feet per second, 223·5. The present capacity of the Kanigiri tank is to be greatly enlarged. The total capacity of the two reservoirs will ultimately be—Kanigiri tank, 6419 millions of cubic feet; Duvur tank, 1043 millions of cubic feet; total, 7462 millions of cubic feet. When finished, the Kanigiri tank will be the largest reservoir in the Madras Presidency.

It is estimated that the works will be completed in 1889–90. The estimate of the work amounts to £356,905, and was sanctioned by the Secretary of State in February 1881. It is anticipated that, on completion of the works, the annual revenue will amount to £23,800. The estimate of annual working expenses is £5026, and the net revenue should therefore be £18,774, or 5·26 per cent. on the total capital.

Sangam village is situated on the north bank of the Penner river, 20 miles above Nellore town. Population (1881) 1212, occupying 250 houses.

Sangameshwar.—Sub-division of Ratnágiri District, Bombay Presidency. Area, 557 square miles. Population (1881) 104,640, namely, males 50,379, and females 54,261, occupying 20,434 houses in 179 villages. Hindus number 99,249; Muhammadans, 4778; and 'others,' 613. The chief river is the Shástri, which cuts the Sub-division nearly in half. Fair amount of alluvial soil in the river valleys, yielding average crops of rice and pulse. Almost all the rest of the Sub-division is crumbled trap. The area of actual cultivation in 1877–78 was 20,423 acres, cereals and millets occupied 19,136 acres; pulses, 736 acres; oil-seeds, 467 acres; fibres, 28 acres; and miscellaneous crops, 56 acres. In 1883 the Sub-division contained 1 civil and 2 criminal courts; police circles (*thinds*), 7; regular police, 59 men. Land revenue (1878), £12,620. Head-quarters, since 1878, at Deorukh

(Devnkh); population (1876) 2660; not separately returned in the Census Report of 1881.

Sangameshwar.—Old head-quarters of Sangameshwar *taluk*, Ratnagiri District, Bombay Presidency; situated on the Shisiri river, about 20 miles from the coast. Lat. $17^{\circ} 9' N.$, and long. $73^{\circ} 36' E.$ Population (1877) 2475; not separately returned in the Census Report of 1881. The river, which 35 years ago was navigable for the largest vessels to the Sangameshwar quay, is now impassable six miles lower down. Trade in grain, piece goods, and salt fish. During the famine of 1877-78, 1440 tons of grain were forwarded from Bombay through Sangameshwar to the Deccan. Early in 1878, 55 houses were burnt; and a few weeks later (March 16th) a disastrous conflagration completely destroyed the Sub-divisional offices and 75 private houses. On the destruction of the public offices the head-quarters of Sangameshwar Sub-division were moved to the more central and convenient village of Devnkh (Devnkh).

Sangamner.—Sub-division of Ahmadnagar District, Bombay Presidency. Area, 708 square miles; greatest length, 40 miles; greatest breadth, 30 miles. Population (1872) 68,765; (1881) 68,357, namely, males 34,774 and females 33,587, occupying 11,767 houses in 1 town and 151 villages. Hindus number 63,488; Muhammadans, 3728; and 'others' 1141. The Sub-division is divided into three distinct portions by the two mountain ranges which traverse it in a parallel direction. The chief rivers are the Pravara and the Mula. The Pravara flows in the valley between the two mountain ranges. With the exception of irrigation from the Ojhar canal, garden cultivation is carried on chiefly by means of wells. A large dam of solid masonry, 830 feet long with a maximum height of 29 feet, was built in 1873 across the dry bed of the Pravara close to the village of Ojhar-Khund. Total cost of the dam, together with the head works, about £6000. The canal which leads the water from the work is on the north side of the river; total area irrigated from the 17 miles which lie in the Sangamner Sub-division, 2227 acres in 1881. Irrigation rates vary from 2s. to 16s. per acre. The area under actual cultivation in 1881-82 was 204,020 acres; cereals and millets occupied 197,190 acres, of which 157,823 acres were under spiked millet (*Pennisetum typhodes*); pulses, 4764 acres; oil seeds, 662 acres; fibres, 11 acres; and miscellaneous crops, 1393 acres. The manufactures are cotton and silk cloth, turbans, woollen blankets, bangles, and saltpetre. Of the 2100 looms in the Sub-division, 2000 are in the town of Sangamner. In 1883 the Sub-division contained 2 civil and 2 criminal courts; police circle (*thana*), 1; regular police, 44 men, village watch (*chaklita*), 189. Land revenue, £7110.

Sangamner.—Chief town of the Sangamner Sub-division of

Ahmadnagar District, Bombay Presidency; situated 49 miles north-west of Ahmadnagar city, in lat. $19^{\circ} 34' 30''$ N., and long. $74^{\circ} 16' 10''$ E. Population (1881) 8796. Hindus numbered 7079; Muhammadans, 1603; Jains, 104; Christians, 7; and 'others,' 3. Besides the ordinary Sub-divisional revenue and police offices, Sangamner has an Assistant Collector's bungalow, post-office, dispensary, and four schools; markets on Wednesdays and Saturdays. Municipality, established in 1860, had in 1883-84 an income of £705; incidence of taxation per head of population, 1s. 4d. Brisk trade; number of looms, 2000.

Sanganer.—Town in Jaipur State, Rájputána; situated on the bank of the Amán-i-Sháh river, 7 miles south-west of Jaipur city, and 3 miles from the Sanganer station on the Rájputána-Malwá State Railway. Its principal features of interest are temples and Jain edifices, one of which is said to be over a thousand years old. Celebrated for dyeing and printing of cotton stuffs.

Sangarh.—Northern *tahsil* of Dera Gházi Khán District, Punjab; consisting of a narrow strip of land between the Suláimán mountains and the Indus. Area, 628 square miles; towns and villages, 136; houses, 8389. Population (1881) 51,779, namely, males 27,730, and females 24,049; average density of population, 82 persons per square mile. Muhammadans number 46,205; Hindus, 5452; and Sikhs, 122. Of the 136 towns and villages in the *tahsil*, 102 contain less than two hundred inhabitants; 20 from five hundred to a thousand; and 14 from one thousand to five thousand. There is no town of Sangarh, nor any place with a population exceeding five thousand inhabitants. The *tahsil* takes its name from a little mountain torrent, the Sangarh; and the head-quarters are at the village of Taunsa. Principal crops—wheat, *bájra*, *joár*, and cotton. Revenue of the *tahsil*, £4977. The administrative staff consists of a *tahsildár* and an honorary magistrate, who preside over 2 civil and 2 criminal courts; strength of regular police, 28 men; village watch or rural police (*chaukidárs*), 38.

Sangarhi.—Town in Sakolí *tahsil*, Bhandára District, Central Provinces; situated in lat. $20^{\circ} 58'$ N., long 80° E., 24 miles south east of Bhandára town, and 3 miles south of the Seoní Lake (*vide* SEONIBAND). Population (1881) 3172, namely, Hindus, 2637, Muhammadans, 178; Jains, 7; and non-Hindu aborigines, 350. Manufactures of cotton cloth, which is largely exported. 110

1 mile from the right bank of the Rohtak branch of the Western Jumna Canal. Population (1881) 5194, namely, Hindus, 4621; Muhammadans, 545; Jains, 25; and 'others,' 3. Number of houses, 844. Rather an agricultural village than a town, with a school and post-office.

Sángli.—Native State in the Political Agency of the Southern Maráthá Country, Bombay Presidency; consisting of six separate divisions—a group of villages near the valley of the Kistna; a second group between the Kolhápúr territory on the west and Jámkháñdi State; a third group in Sholápur District, near the junction of the Mán and Bhíma rivers; a fourth in Dhárwár District; a fifth just north of the town of Belgáum; and the last to the south of the river Malprabha and to the north-east of Kittúr in Belgáum. The State contains a total area of 896 square miles, of which about 91 square miles are under forest. Population (1872) 223,663; (1881) 196,832, namely, males 98,037, and females 98,795, occupying 31,183 houses, in 5 towns and 235 villages. Hindus number 172,257; Muhammadans, 13,082; and 'others,' 11,493.

The portion of the State of Súngli watered by the Kistna is flat, and the soil particularly rich. The remaining divisions are plains surrounded by undulating lands, and occasionally intersected by ridges of hills. The prevailing soil is black. Irrigation is carried on from rivers, wells, and tanks. The climate is the same as that of the Deccan generally, the air being very dry, especially when east winds prevail. The most common diseases are cholera, small-pox, and fever. The chief products are millet, rice, wheat, gram, and cotton; and the manufactures coarse cotton cloth, and native articles of apparel.

The chief of Súngli is a member of the Patwardhan family, whose founder Haribhat, a Konkan Bráhmañ, rose to military command under the first Peshwá, and received grants of land on condition of military service. In 1772, Miraj descended to Chintáman Ráo, grandson of Govind Ráo Hari, the original grantee. Chintáman Ráo being a child of six years, the State was managed during his minority by his uncle, Gangádhár Ráo. When the minor came of age, he quarrelled with his uncle, who attempted to keep him out of his rights. Eventually the estate was divided between them, the uncle retaining Miraj, and Chintáman Ráo taking Súngli. The revenue of Súngli was £63,518, and of Miraj, £47,980; the estates being respectively subject to a service of 1920 and 1219 horse. Chintáman Ráo, the father of the present chief of Súngli, became a feudatory of the British Government on the downfall of the Peshwá in 1818-19. In 1846, the East India Company presented him with a sword in testimony of their respect for his high character, and in acknowledgment of his fidelity and attachment to the British Government. Chintáman Ráo died in 1851. The

chief of Sāngli does not now pay any contribution on account of military service, having ceded lands of the annual value of £13,500 in lieu hereof. The family hold a title authorizing adoption.

The present chief is Dhundi Rāo Chintāman, a Hindu of the Brāhman caste. He ranks as a 'first-class' Sardār in the Southern Marāṭhā Country, and has power to try capital offences without the express permission of the Political Agent. This power, however, applies to his own subjects only. In consequence of misgovernment by the chief, an English officer was in 1873 appointed as Joint Administrator. The share of the chief in the administration consists in signing such papers as are placed before him. Every improvement has proceeded from the Joint Administrator. The chief enjoys an estimated gross revenue of £98,135, and maintains a police force of 473 men; of these, 43 are mounted, 24 are employed in the State band, and 110 are armed. There were in 1883-84, 60 schools, of which 4 were girls' schools and 4 Anglo-vernacular; number of pupils, 3611. Indigenous schools numbered 36. There are in the State 5 municipalities; the largest has an income of £1238, and the smallest of £117. In the eight jails of the State, 732 persons were confined in 1883-84.

Sāngli.—Chief town of Sāngli State, Bombay Presidency; situated in lat. 16° 51' 35" N., and long. 74° 36' 20" E., on the river Kistna, a little north of the confluence of the Wārna, and north-east of Kolhāpur. Population (1872) 12,961, (1881) 13,272, namely, males 6755, and females 6517. Hindus numbered 10,786, Muhammadans, 1660; Jains, 820; and Christians, 6. The income of the municipality in 1883-84 was £1238. The fort, in which is the chief's palace and most of the public offices, was built about 80 years ago. Dispensary and ten schools, including one for girls.

Sangod.—Town in Kotah State, Rājputāna. Population (1881) 5006, namely, Hindus, 4261; Muhammadans, 582; and 'others,' 163.

Sāngola.—Sub-division of Sholāpur District, Bombay Presidency, situated in the south-west corner of the District. Lat. 17° 8' to 17° 40' N., and long. 74° 59' to 75° 32' E. Area, 649 square miles. Population (1872) 62,960; (1881) 62,849, namely, males 31,797, and females 31,052, occupying 8196 houses, in 1 town and 75 villages. Hindus number 60,540, Muhammadans, 2197; and 'others,' 112. Sāngola is a level plain with a few treeless hillocks fringing its southern border. It is mostly bare of trees. Villages are three or four miles apart. The chief river is the Mān, which drains the Sub-division from west to north-east for about 35 miles. Most of the soil is stony and barren; and much of it fit only for grazing. In 1882-83, including alienated lands, the total number of holdings was 5259, with an average area of about 54 acres. In 1881-82, the area under actual cultivation was 215,894 acres, of which 8019 were twice cropped. Cereals and millets

occupied 187,840 acres; pulses, 16,982; oil-seeds, 9801 acres; fibres, 5599 acres; and miscellaneous crops, 3691 acres. In 1883 the Sub-division contained 1 civil and 2 criminal courts; police circles (*thánds*), 3; regular police, 37 men; village watch (*chaukidárs*), 115. Land revenue, £8454.

Sángola.—Chief town of the SÁNGOLA Sub-division of Sholápur District, Bombay Presidency, situated 19 miles south-west of Pandharpur, in lat. $17^{\circ} 26' 30''$ N., and long. $75^{\circ} 14' 15''$ E. Population (1881) 4726, namely, Hindus, 4294; Muhammadans, 403; and Jains, 29. Besides the revenue and police officers of the Sub-division, SÁNGOLA has a post-office, two schools, and a fort. The fort, which is now occupied by the Sub-divisional offices, is said to have been built by a Bijápur king; and so prosperous was the town which grew up round it, that until it was plundered by Holkar's Patháns in 1802, it was locally called the Golden SÁNGOLA (*Sonyáche SÁNGOLA*). The town has never recovered the sack of 1802. Municipality, established in 1855, had an income in 1883-84 of £146; incidence of taxation per head of population, 7d.

Sangrámpur.—Town in Champáran District, Bengal; situated in lat. $26^{\circ} 28' 38''$ N., and long. $84^{\circ} 44'$ E., on the river Gandak. Population (1872) 6181. Not separately returned in the Census Report of 1881.

Sangri.—One of the Simla Hill States, Punjab. Area, 16 square miles. Sangri is situated south of the river Sutlej (Satlaj), and formerly belonged to the Rájás of Kúlu, whose main possessions lay north of that river. Population (1881) 2593, all Hindus, residing in 435 houses; number of families, 550. When the Gúrkhas were expelled by the British in 1815, the estate was restored to the Rájá of Kúlu. His territories north of the Sutlej were, however, conquered by the Sikhs, and the Rájá took refuge in Sangri, where he died childless in 1841. On the country falling under British power after the first Sikh war, his nephew was recognised, in 1847, as chief of Sangri. The present (1884) Tika of Sangri is Hira Singh, a Rajput. Estimated gross revenue, £100. The chief products are opium and grain.

Sangu.—Sub-division of the Chittagong Hill Tracts, Bengal, formed in March 1867. It comprises the tract of country between the rivers Sangu and Mátámuri, along the north-eastern frontier of Bengal. Owing to the manner in which the Census of 1881 was taken in this backward District, no separate details of population, etc. are available. In 1883 the Sub-division contained 1 civil and 1 criminal court, with a regular police force of 32 men, and a semi-military frontier police numbering 135.

Sangu.—River of Chittagong, Bengal; rises in the range of hills dividing Arakan from the Chittagong Hill Tracts, near the hill of Kudáng. After a circuitous course of about 125 miles, generally

northerly, over a rocky bed, it reaches Bandárbán, from which town it takes a tortuous westerly direction through Chittagong District, and finally empties itself into the Bay of Bengal, in lat. $22^{\circ} 6' 30''$, and long. $91^{\circ} 53' E.$, about 10 miles south of the Karnaphuli. The Sangu is tidal as far as Bandárbán; its bed here is sandy. Though shallow in ordinary times, during the rains this river becomes deep, dangerous, and rapid. In its upper reaches, the Sangu is called by the hillmen the Rigray Khyaung; midway, before entering the plains, it is known as the Sabák Khyaung. It is navigable by large cargo boats for a distance of 30 miles throughout the year. The principal tributary is the Dohu.

Sanivarsante.—*Kusá* or administrative headquarters of Velusa-virashime *táluk*, in the territory of Coorg. Lies on the Merkara Kodlipet road. Distance from Merkara, 38 miles. Population (1881) 390. The name of the village is derived from a weekly fair held on Saturday. Manufacture of coarse cloth.

Sanján.—Small village in Thána (Tanna) District, Bombay Presidency, and a station on the Bombay, Baroda, and Central India Railway. Believed to have been formerly a large town, and the place where the Pársis first landed in India. Known to the Portuguese, and long after their time, as 'St. John'

Sanjeli.—Petty State of Rewá Kántha, Bombay Presidency. Area, $33\frac{1}{2}$ square miles, contains 12 villages. Population (1881) 3751. Estimated revenue, £700. No tribute is paid. The chief is named Thákur Partáb Sinhji. The land is fertile, but the people are Bhils and poor husbandmen.

Sankaridrúg (*Sanka-giri Durgam*)—Village in Trichengod *táluk*, Salem District, Madras. Lat $11^{\circ} 28' 52'' N.$, long $77^{\circ} 55' 40'' E.$ Population (1881) 1302, dwelling in 280 houses. Sub-magistrate's court, railway station, Roman Catholic chapel, and telegraph office.

The village is situated at the foot of the Durgam or Drúg, a square mass of gneiss rising 1000 feet above the plain, and 2345 feet above sea-level, completely terraced with fortifications, while half-way up, like a pearl set in emeralds, a white mosque nestles amongst the rich foliage which still covers part of the hill. On the summit is a small plateau, with a good supply of water stored in the rock. Viewed from below, the hill is a source of interest to the geologist, from the very fine specimens of granite veins piercing the gneiss, which have been exposed in the course of ages.

The Drúg was a place of great strength, and was not attempted by Colonel Wood in 1768, when he captured all the surrounding forts. The fortifications on the summit show traces of European engineering.

Sankarkati.—Village in Khúlna District, Bengal. Noted for its

numerously attended fair held during the *Durgā-pūjā*, *Dol*, and *Rath Jātrā* festivals. Bi-weekly market.

Sankarnainārkoil.—*Tiluk* or Sub-division of Tinneveli District, Madras Presidency. Area, 712 square miles. Population (1881) 181,064, namely, males 89,566, and females 91,498, occupying 37,817 houses, in 3 towns and 110 villages. Hindus number 172,633; Muhammadans, 2666; Christians, 5761; and 'others,' 4. The *tīluk* lies at the foot of the *ghāts*, and contains both red and black soils. The red-soil country is broken into valleys and ridges by numerous small torrents and streams descending from the mountains. Its principal wealth lies in its irrigated lands. Rice, plantain-gardens, and betel-vines are the products grown under irrigation. One-fourth of the whole area is black cotton soil, being a portion of the great cotton plain which occupies the north and north-east portion of Tinneveli District. The greater portion of the cotton soil of the *tīluk* is poor. In 1883 the *tīluk* contained 2 criminal courts; police circles (*thānds*), 8; regular police, 52 men. Land revenue, £26,464.

Sankarnainārkoil.—Town in Tinneveli District, Madras Presidency; situated in lat. 9° 10' 10" N., and long. 77° 34' 35" E., 10 miles east of the road from Madura to Travancore. Population (1881) 8212, dwelling in 1542 houses. Hindus number 7679; Muhammadans, 455; and Christians, 78. A large, well-built town, with fine temples and tanks; and the head-quarters of Sankarnainārkoil *tīluk*. Post-office.

Sankarpur.—Town in Chāndā District, Central Provinces; situated in lat. 20° 38' N., and long. 79° 34' E., 16 miles north-north-east of Chimar. Population (1881) 1758. Government school. Under the Marāthās, a cannon foundry was worked in Sankarpur, and some half-finished guns yet remain.

Sankeswar (more correctly *Shankheswar* or 'the *Shankh* god').—Town in Belgāum District, Bombay Presidency; situated in lat. 16° 15' N., and long. 74° 31' 30" E., 27 miles north by west of Belgāum town. Population (1881) 8109. Sankeswar has a large traffic carried on by about 50 traders, who export cotton and import dry cocoa-nuts, dates, spices, and curry stuff. The ordinary industry is the weaving of waist-cloths, women's robes, and blankets. Post-office, three schools, two of them private, an old temple, and a monastery.

Sankh.—River of Chutiā Nagpur, Bengal; rises in the west of Lohardāgā District, and after a tortuous course of 120 miles, first south-westerly and then south-easterly, joins the South Koel in Gangpur State. The united stream, under the name of the Brāhmanī, enters the sea in the north of Orissa. The confluence of the South Koel and the Sankh is the most picturesque spot in Gangpur. Local tradition

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Sankarnainārkoil.—*Tāluk* or Sub-division of Tinneveli District, Madras Presidency. Area, 712 square miles. Population (1881) 181,064, namely, males 89,566, and females 91,498, occupying 37,817 houses, in 3 towns and 110 villages. Hindus number 172,633; Muhammadans, 2666; Christians, 5761; and 'others,' 4. The *tāluk* lies at the foot of the *ghāts*, and contains both red and black soils. The red-soil country is broken into valleys and ridges by numerous small torrents and streams descending from the mountains. Its principal wealth lies in its irrigated lands. Rice, plantain-gardens, and betel-vines are the products grown under irrigation. One-fourth of the whole area is black cotton soil, being a portion of the great cotton plain which occupies the north and north-east portion of Tinneveli District. The greater portion of the cotton soil of the *tāluk* is poor. In 1883 the *tāluk* contained 2 criminal courts; police circles (*thānds*), 8; regular police, 52 men. Land revenue, £26,464.

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Sankh.—River of Chutā Nāgpur, Bengal; rises in the west of Lohardagā District, and after a tortuous course of 120 miles, first south-westerly and then south-easterly, joins the South Koel in Gangpur State. The united stream, under the name of the Brāhmanī, enters the sea in the north of Orissa. The confluence of the South Koel and the Sankh is the most picturesque spot in Gangpur. Local tradition

... village and ruins in Bannatung District, North-Western
... dominated by General Cunningham with the jealousy of the
... which turned the capital of a considerable kingdom in the
... century A.D. Situated on the Salween river, 22 miles west of Bhamo.
... visited by Hsüan Tsang about 630 A.D., and by Hiuen Tsang
... 640 A.D., when it was a celebrated place of Buddhist pilgrimage as
... the reputed spot where Buddha accompanied by Arhat and
... monks descended again upon earth by three staircases of gold, silver,
... crystal or precious stones after a residence of three months in the
... heaven, spent six preaching the law to his mother. May be
... the three staircases are believed to have sunk underground immediately
... after leaving earth seven days visible. King Anika
... pillar to commemorate the event, but no remains
... certainly be discovered. Hiuen Tsang mentions
... the memorial pillar were at his time, enclosed within
... the walls of a great monastery.

The existing village is perched upon a mound of ruins, known as the
Hill or fort, 41 feet in height, with a superficial extent of 1000 feet by
1000. A quarter of a mile southward is another mound, composed of
solid brickwork, and surmounted by a temple to Siam Deu. North

of the temple mound, at a distance of 400 feet, lies the capital of an ancient pillar, bearing an erect figure of an elephant, wanting the trunk and tail. The capital is described by General Cunningham as being of the well-known bell-shape, reeded perpendicularly with a honeysuckle abacus, as in the pillar at Allahābād; and it evidently belongs to the same period, the 3rd century B.C. Hence General Cunningham considers it identical with Asoka's monument, mentioned by the Chinese Pilgrims, although the latter was said to be crowned by the figure of a lion—a discrepancy which the learned archæologist explains away by supposing that the trunk was already broken off in the 5th century A.D., and that the animal could no longer be distinguished at a height of 50 feet above the ground.

South of the temple of Bisāri Devi, again, at a distance of 200 feet, occurs a third small mound of ruins, apparently the remains of a *stupa*; while, 600 feet due east is a fourth mound, 600 feet by 500, known as Nivi-ka-kot, which seems to contain the remains of some large enclosed building like a Buddhist monastery. The fort and the various mounds which surround the temple form a mass of ruins 3000 feet in length by 2000 in breadth, or nearly 2 miles in circuit; but this space appears only to enclose the citadel and the religious edifices which gathered round the three holy staircases by which Buddha descended upon the earth. The city itself, which surrounded the central holy enclosure, was girt by an earthen rampart upwards of $3\frac{1}{2}$ miles in circumference, and still distinctly traceable in the shape of an irregular dodecagon. Three openings which occur in the rampart are traditionally pointed out as the gates of the ancient city. South-east of the Sankisa ruins lies the tank of the Nāga, known as Karewar, and identified with a 'dragon tank' described by Fa-Hian. The city was probably destroyed during the wars between Prithwi Rāj of Delhi and Jai Chand of Kanauj. Other interesting ruins occur in the neighbouring village of SARAI-AGHAT, $\frac{3}{4}$ mile distant north-west.

Sankos (or *Suvarnakos*; so called from its golden sands).—River of North-Eastern Bengal, flowing through the low tract of country between the Himālayas and the Brahmaputra, where no river preserves its identity amid the frequent fluvial changes that take place year by year. It can only be affirmed that the name is given to a different part of its course, to a river that flows southward from the Thātān Hills, and ultimately joins the Brahmaputra, in lat. 25° N. long. $89^{\circ} 52'$ E. The main channel of this river forms the boundary between the Eastern and Western Dwārs, thus separating Bengal from Assam. Its chief tributaries are the Kālajāni and Rāidhak on the right bank, and the Gadādhār on the left. The name of the GADADHAR is commonly applied to the united stream.

Sankshi (Sakse).—Customs division in Kolāba District, Bombay

Presidency. Under Sánkshi are two ports—Antora, the port of Pen on the Pen creek, and Nágothna at the head of the Rewa creek or Amba river. Average annual value of sea-borne trade for the five years ending 1883-84—imports, £42,690; exports, £87,172; total, £129,862. In 1883-84 the trade amounted to—imports, £42,041; exports, £87,498; total, £129,539.

Sánkshi (also known as *Badr-ud-din* or *Dargahcha Kila*, from a tomb or *dargah* of the saint Badr-ud-din at its foot)—Fort in the Pen Sub-division of Kolába District, Bombay Presidency; situated on a hill about five miles north-east of Pen town. The scene of repeated struggles between the Gujarát and Ahmadnagar princes and the Portuguese, passing into the possession of either power more than once. In 1827, Sánkshi was the scene of an encounter between a detachment of the 4th Rifles and a band of fanatical *dakáits*, in which three European soldiers were killed. The place was the head-quarters of a Sub-division until 1866, when they were removed to Pen.

Sann.—Town in the Mánjhand *táluk* of Sehván Sub-division, Karáchi (Kurrachee) District, Sind, Bombay Presidency; situated in lat. 26° N., and long. 68° 8' E., close to the western bank of the Indus, at the mouth of a torrent that issues from the Lakí Hills; on the main road from Kotri to Sehván, being 11 miles north of Mánjhand, and 11 south of Amri. Sann station, on the Sind, Punjab, and Delhi Railway, is a little more than two miles from the town. To the south-west of Sann is the ruined fort of Ránf-ka-kot, said to have been constructed by two of the Talpur Mirs early in the present century, at a cost of 12 *lákhs* of rupees (say £120,000). Originally the river flowed near the walls, but when its course changed, the fort was abandoned. Sann has no trade or manufactures of any consequence; but as it is situated on the trunk road, *káfilas* (caravans), with various commodities from Kandahár and Kheldt, pass through it. Sann is the head-quarters of a *tappadár*; it also contains a post-office, school, *dharmshála*, and a small police post. Population (1872) 1798, namely, 1362 Muhammadans and 436 Hindus; not separately returned in the Census Report of 1881.

Sanosra.—Petty State in the Jháláwár division of Káthiáwár, Bombay Presidency; consisting of 3 villages, with 1 shareholder or tribute-payer. Area, 13 square miles. Population (1881) 1140. Estimated revenue, £403, of which £18, 12s. is paid as tribute to the British Government, and £5, os. 2d. to the Nawáb of Junágarh.

Sansar Dhára.—Grotto and place of pilgrimage in Dehra Dún District, North-Western Provinces. Lat. 30° 21' N., long. 78° 6' E. A waterfall gushes from a cleft in the rock, with a grotto behind it, in which stalactites are formed. The Hindus consider it sacred to Mahádeva, and visit it in considerable numbers. Distant from Mussooree (Masúri) about 12 miles.

Santál Parganáś, The.—District in the Lieutenant-Governorship of Bengal, lying between $23^{\circ} 48'$ and $25^{\circ} 19'$ N. lat., and between $86^{\circ} 30'$ and $87^{\circ} 58'$ E. long. Area, 5456 square miles. Population, according to the Census of 1881, 1,568,093 souls. The Santál Parganáś form the southern portion of the Bhágalpur Division. They are bounded on the north by the Districts of Bhágalpur and Purniah; on the east by Maldah, Murshidábád, and Bírbbhúm; on the south by Bardwán and Mánbbhúm; and on the west by Hazáribágh, Monghyr, and Bhágalpur. The administrative head-quarters are at DUMKA.

Physical Aspects.—Three distinct types of country are represented in the Santál Parganáś. In the east of the District, a belt of hills stretches with a semicircular curve for about a hundred miles from the Ganges to the Núnbil river. West of this is a rolling tract of long ridges with intervening depressions, covering an area of about 2500 square miles. The third type is exemplified by a narrow, almost continuous, strip of alluvial land about 170 miles in length, lying for the most part along the loop-line of the East Indian Railway. The total area of this alluvial tract is about 650 square miles. The undulating upland tract, which includes the Sub-divisions of Deogarh and Jamtára and the southern portion of Goddá, is in many parts overgrown with jungle; and the gneiss, which forms the geological basis of the District generally, is here overlaid by the carboniferous shales and sandstones that form the Deogarh coal-field.

The RAJMAHAL HILLS, which abruptly rise from the valley of the Ganges, were, until very recently, regarded as a continuation of the Vindhyan range of Central India. It has been found, however, that not only are they physically quite detached from the Vindhyan hill system, but geologically there is nothing in common between the two. The Rájmahál Hills occupy an area of about 2000 square miles, of which 1366 square miles are in the Government estate of the Dáman-i-koh; they nowhere rise higher than 2000 feet above the sea, their average elevation being considerably less. Among the highest ridges are Mori and Sendgarsa, each about 2000 feet above the sea. The principal ranges of the Rájmahál Hills outside the Dáman-i-koh are the Núi, Sankara, Rámgarh, Kulanga, Sarbor, Sundardihi, Lakshmanpúr, and Sabchala. Singanmát, a peak in the Sankara range, is well known as a landmark for all the country round. Most of these hills are covered almost to their summits with dense jungle, and are difficult of access. There are, however, numerous passes through the successive ranges, over which good roads might without difficulty be made.

The Ganges forms the northern and a large part of the eastern boundary of the Santál Parganáś, and all the rivers of the District eventually flow either into it or into the Bhágirathí. The chief of these rivers are the Gumáni, the Moral, the Bánsloi, the Bráhmañ, the Mor or

Morákhī with its tributary the Naubil, the Ajai, and the Barákhār. None of them is navigable throughout the year.

Forests.—Although the face of the country is to a large extent covered with jungle, there are no forests in the Santál Parganá which contain timber of much commercial value. Government obtains a small revenue by leasing out the right to cut timber for fire-wood in the Dáman-i-koh; and trifling amounts are realized by the landholders in the form of royalties on every axe employed in cutting wood. The characteristic tree of the jungles of the District is the *sál*, large numbers of which are floated down the Mor during the rains, while still more are exported during the dry season on *sagars* or block-wheeled carts.

Jungle Products.—The principal jungle products of the Santál Parganá are the following:—Lac, found on the *palís*, *ber*, and *pápal* trees, and exported in small quantities from the Mahárájpur station, but not locally manufactured. *Tasar* silk cocoons are gathered in large quantities by the Santáls and Paháriás. *Dhund* or resin is obtained by girdling the *sál* tree. Beeswax, catechu, honey, *sábui* grass, *kónjú*, and *jombár*, two creepers used for making rope, and also a variety of edible products, are collected in the jungles. The use of jungle products as a means of subsistence is confined, for the most part, to Paháriás, Santáls, and Bhuiyás. Patches of grazing ground are to be found in all the hills and jungles, but cattle are not brought from other Districts for grazing.

Minerals.—Coal and iron are found in almost all parts of the Santál Parganá. The various attempts that have been made to work coal-mines, and to quarry building-stone in the District, are noticed in a subsequent paragraph. In 1850, some copper and silver ores were dug up by Captain Sherwill in the Sub-District of Deoghar. Fourteen pounds of silver ore were treated in Calcutta by Mr. H. Piddington, Curator of the Museum of Economic Geology, and yielded 154 grains of pure silver, showing it to be 'far above an average ore.' The copper ore was found to be very poor. Picturesque waterfalls are formed near the villages of Kuskirá, Sinhpur, and Mahárájpur, and there are several mineral springs in the District.

Fera Naturæ.—Tigers, leopards, bears, hyænas, deer, and wild hog, with a variety of small game, are common almost everywhere. Elephants and rhinoceros used to be seen, but have now almost died out. Wild ducks, pigeons, geese, snipe, partridges, and quail abound in the marshes of the alluvial part of the District.

History.—The administrative history of the Santál Parganá is the history of the gradual withdrawal of the territory now comprised in the District from the operation of the general Regulations; that withdrawal being throughout dictated by a regard for the peculiar national

character of the two races of Paháráís and Santáls. The policy was in the first instance set on foot by Mr. Augustus Cleveland, Collector of Bhágálpur, in the rules which he proposed for the management of the Paháráís between 1780 and 1784. These rules, which are referred to in the article on BHAGALPUR DISTRICT, were incorporated in Regulation I. of 1796, so that Cleveland has a fair claim to be considered the author of the Non-Regulation system. It followed, however, from confirming the Paháráís in possession of the hills, that disputes arose between them and the Hindu *samíndárs* of the plains as to the right of grazing cattle and cutting timber along the lower slopes. That the hills had really or nominally belonged to the *samíndárs*, there can be no doubt; but the troubles following the British accession, and shortly afterwards the great famine of 1769-70, had weakened or destroyed their control. Cleveland practically assumed possession of the hills on behalf of Government; they were excluded from the Permanent Settlement in 1793; and finally in 1823, the Government by Resolution declared its proprietary right in the hills, and ordered that the tract covered by this declaration should be demarcated. Accordingly, in 1825, two Government officials were deputed to demarcate with solid masonry pillars the present area of the Dáman-i-koh or 'skirts of the hills,' a work which was not completed till 1833. The great central valley still remained the property of the *samíndár* of *parganá* Bhágálpur till 1839, when it too was resumed. The permission to Santáls to settle in the valleys and on the lower slopes of the Dáman-i-koh stimulated Santál immigration to an enormous extent; and it might be supposed that the natural consequence of that immigration would have been the admission of the Santáls to the exceptional privileges which the Paháráís already enjoyed. But this measure, although more than once proposed, was not approved by Government; and the next phase in the history of the District is the Santál rebellion of 1855-56.

The story of that rebellion, and the causes which led to it, would occupy more space than can here be given; but the reader will find an exhaustive account of it in Hunter's *Annals of Rural Bengal*, and a shorter sketch under article INDIA (*ante*, Vol. VI.). The Santáls, starting with the desire to revenge themselves on the Hindu money-lenders who had taken advantage of their simplicity and improvidence, found themselves arrayed in arms against the British Government. The insurrection was not repressed without bloodshed, but it led to the establishment of a form of administration congenial to the Santál immigrants; and a land settlement has recently been carried out on conditions favourable to the occupants of the soil.

Population.—No estimate of the population of the entire District exists previous to the Census of 1872. That enumeration disclosed a total of 1,259,287 persons; while the last Census in 1881 returned

a total of 1,586,093, or an apparent increase of 308,806, or 24·52 per cent., in 9 years. This increase, however, is to a very large extent only nominal, and is mainly attributable to the much greater accuracy of the enumeration in 1881. The results of the Census of 1881 may be summarized as follows:—Area of District, 5456 square miles; towns 4, and villages 11,250; number of houses, 252,486, namely, 246,746 occupied, and 5740 unoccupied. Total population, 1,568,093, namely, males 785,330, and females 782,763. Average density of population, 287·4 persons per square mile; towns and villages per square mile, 2·06; persons per town or village, 139; houses per square mile, 46·28; persons per occupied house, 6·36. Classified according to sex and age, there were—under 15 years of age, boys 368,939, and girls 358,530; total children, 727,469, or 46·4 per cent. of the population: 15 years and upwards, men 416,391, and women 424,233; total adults, 840,624, or 53·6 per cent. The abnormally large proportion of children is due to the fact that the aboriginal Santáls are one of the most prolific races in Bengal.

Religion.—Classified according to religion, the Census of 1881 returned the population as follows:—Hindus, 847,590, or 53·4 per cent.; Muhammadans, 108,899, or 6·8 per cent., Christians, 3057; Buddhists, 132; Sikhs, 54; Jains, 2; Jews, 6; and tribes professing aboriginal religions, 608,353, or 38·4 per cent., of whom 559,602 were Santáls and 11,995 Kols, the remainder being made up of other tribes.

Among the higher Hindu castes, Bráhmans number 36,075, Rájputs, 28,124; Bábhans or cultivating Bráhmans, 5406; Káyasths, 7820; and Baniyás, 28,124. The lower or Súdra castes of Hindus include the following:—Ghátwál, not properly a caste, although returned as such in the Census Report, but a branch of the aboriginal race of Bhuiyás. They, however, take the name of Ghátwál as a caste designation to denote their occupation as guardians of the hill passes. They keep fowls and pigs; but the well-to-do members of the tribe claim to be Kshattriyas. The number of Ghátwáls returned as such in the Census Report of 1881 was 38,032. Goálá, the most numerous caste in the District, 88,544; Dom, 35,723; Chamár, 33,546, Lohár, 26,433; Telí, 24,986; Nápit, 21,714; Kumbhár, 21,484, Mál, 20,533; Sunri, 19,059; Musahár, 18,588; Baurí, 18,515; Kahárs, 16,608; Koerí, 13,589; Madak, 13,462; Kurmí, 13,177, Dhanuk, 12,162; Kalu, 10,929; Dosádih, 10,801; Kaibartta, 10,749, Han, 8894; Tántí, 8864; Dhobí, 8052; Rájwar, 6215; Barhá, 5841; Bágdi, 5104; Kalkár, 4673; Sonár, 4156; Málí, 3807; Tainbulí, 3186; Mallah, 2799; Kandu, 2772; Chásá, 2626; Sadgop, 2471; Pasí, 2420; Tatwá, 2401; Tior, 2381; and Baruí, 2218. Caste-rejecting Hindus were returned at 8193, of whom 6346 were Vaishnavs.

The Muhammadans in 1881 numbered 108,899, or 6·33 per cent. of the population, classified according to sect into—Sunnis, 96,736; Shiás, 2607; and unspecified, 9556. The Musalmán population of Deogarh Sub-division is said to have been introduced early in the 18th century by the Muhammadan Rájá of Nagar in Bírbum District, of whose *zamindárl* or principality it formed a part. In Dumká Sub-division, the Muhammadans mostly belong to the low weaving castes, whose adherence to the religion of Islám is little more than nominal. A few Wahábl revivalists are found in Rájmahál Sub-division, where the landholders are Muhammadans, and memories of Musalmán domination still survive. Taking the Santál Parganá as a whole, the Muhammadans do not hold a high social position, and are a far less wealthy and less influential body than the Hindus.

Of the aboriginal population, 608,353 are returned as still professing their primitive faiths. Of these, 559,602 are returned as Santáls, 11,995 as Kols, and 36,756 as belonging to other aboriginal tribes. Besides these, the Census returns show 108,355 aborigines among Hindus, consisting of—Bhuiyás, 61,640; Santáls, 9148; Bhumis, 3880; Khárwárs, 2862; Kols, 2094; Gonds, 571; and other tribes, 28,160. The Paháriás are not returned separately in the Census of 1881, and are probably included with the general body of Santáls. Total Hindu and non-Hindu aboriginal population, 716,708. This, however, does not include aborigines converted to the faith of Islám or to Christianity; and the list of Hindu castes includes several undoubted aboriginal and semi-aboriginal tribes; e.g. the Ghátwáls, Baurís, Bindis, etc. An account of the Santáls forms the subject of the following article in this volume.

The Christian population of the Santál Parganá amounted at the time of the Census of 1881 to 3057 souls, namely, Europeans, Americans, and Africans, 182; Eurasians, 108; natives of India, 2718; and 'others,' 49. Nearly all the converts belong to the aboriginal races who are engaged in agriculture; and Christianity has produced little effect upon the general Hindu population, or on the more civilised inhabitants of the towns. The Church Missionary Society has stations in the District at Hiránpur, Tálhari, Godda, Bhagaiá, and Baháwa; as also has the Santál Home Mission, with its head-quarters at Dumká. A private mission carries on work in Jamtára. Within the past few years, attempts have been made, through the Rev. L. O. Skrefsrud, the head of the Santál Home Mission, to improve the condition of the converts by establishing Christian colonies of Santál agriculturists in Assam, where unlimited spare land is available. Between 1880 and 1885, nine such villages, with a total population of between 600 and 700 men, women, and children, had been settled in the Gumá *dwár* tract of Goalpárá District. The Rev. H. P. Doerrensens, in charge of

the Settlement, reported in September 1885, that the colony had successfully passed the initial stage of experiment; that a considerable area of land had been reclaimed from jungle and brought under cultivation; that, free from the pressure of Bengali landlords and usurers, and with a splendid soil yielding rich crops, the colonists, with three or four individual exceptions, had all become well-to-do, and many of them rich according to Santal ideas. The whole of the debt due to Government, incurred in the shape of advances made to start the undertaking, has been paid off by the settlers.

Ethnical Division of the People.—The distribution of the races in the Santal Parganas is traceable rather to the controlling action of Government, than to the geographical position or physical conformation of the District. The colony of Pahariás which occupies the Rajmahal hills is like an advanced outpost, cut off from the main body of the aboriginal races farther west by the great Aryan line of communication between Bengal and Behar. Although the crests of the ranges are barren enough to deter any other race from contesting their possession with the Pahariás, yet there is little doubt that but for the ring fence erected by Government between 1825 and 1833, all the lands of the lower levels would have been occupied by Bengali or Hindustani immigrants. Since the enclosure of the Daman-i-koh, however, a continual stream of Santal immigrants has been pouring into the District from Hazaribagh and Manbhūm, and occupying the valleys and lower slopes of the hills which the Pahariás do not cultivate. The remaining inhabitants of the District are either Bengali immigrants from the south-east, or Hindustanis from the north-west; but the Census returns afford no means of estimating the relative strength of the two nationalities in the Santal Parganas. With reference to the three tracts of hilly, undulating, and alluvial country into which the District is divided, it may be laid down with approximate correctness that the hilly country is inhabited mainly by Santals, Pahariás, and other aboriginal tribes; the undulating region by semi-aboriginal races, with a smaller proportion of aborigines and a fair sprinkling of Aryan settlers; and the alluvial strip of country almost entirely by Aryans.

Town and Rural Population.—The population is almost entirely rural, and the only places with upwards of five thousand inhabitants are DROGAH, population (1881) 8005; and SAHIBGANJ, the great commercial mart on the Ganges, population 6512. The only other places with any pretensions to be called towns are DUMKA, the administrative head-quarters of the District, 2075; and RAJMAHAL, 3839. Of the 11,250 villages, as many as 8998 contain less than two hundred inhabitants; 1881 between two hundred and five hundred; 335 between five hundred and a thousand; 33 between one thousand and two thousand; and 3 between two thousand and three thousand inhabitants.

As regards occupation, the Census Report returns the male population under the following six classes:—(1) Professional class, including civil and military, 7134; (2) domestic class, 14,625; (3) commercial class, including traders and carriers, 15,323; (4) agricultural and pastoral class, including gardeners, 325,718; (5) manufacturing and industrial class, including all artisans, 27,593; and (6) indefinite and unspecified class, comprising general labourers and male children, 394,937.

Agriculture.—Rice forms the staple food-grain of the District. *Jārdān* or *dman* rice, the winter crop of the year, is of two kinds—*bādo*, which is sown broadcast; and *ropl dhdān*, which is transplanted; of these, forty varieties are named. In the alluvial strip of country which runs along the eastern boundary of the District, rice is largely cultivated; and the lower slopes of the ridges in the undulating tract, as well as the swampy ground between those ridges, are also sown with rice. Level terraces are cut out of the hillsides, which thus present the appearance of a series of steps varying from one to five feet in height. These rice terraces are flooded as soon as possible after the rains set in, small banks being left round the edge of each plot to hold the water. Among the other crops of the District are millets, wheat, barley, maize, various pulses and oil-seeds, jute, flax, sugar-cane (of which four varieties are distinguished), cotton, and indigo. There are two seasons for sowing indigo: the spring sowings are put into the ground in March, and reaped in June; and the autumn or October sowings are also cut in the following June.

No accurate statistics are available showing the area under different crops; and it is evident from what has been said regarding the physical aspects of the District, and the mode of rice cultivation in the undulating tract, that there would be considerable difficulty in estimating the aggregate area under rice. The food crops grown in the District are, (1) rice, (2) *janird* or maize, and (3) other grains, such as millet and pulses. Of this food supply locally produced, rice forms eleven-sixteenths; *janird* three-sixteenths. There are large stretches of spare land all over the District, and cultivation is being gradually extended to them.

No scientific system of rotation has as yet been developed, but a sort of rotation is followed on high lands only recently brought under cultivation, which are sown for three successive years with oil-seeds or pulses. On homestead lands around the cultivator's house, which can be thoroughly manured, it is a common practice to alternate Indian corn with mustard. Manure, consisting of cow-dung, wood ashes, and mud from the bottom of tanks, is commonly used for sugar-cane, and for such high land crops as Indian corn, tobacco, and mustard, when they are in the neighbourhood of the house, and can conveniently be

attended to. Rice is not manured at all. Irrigation is effected for the most part by *bāndhs* or small embankments thrown across the upper and narrower ends of the trough-like hollows which make up the surface of the country. Each embankment thus holds up the natural drainage and forms a small reservoir at a high level. Land below the *bāndh* growing a rice crop can be irrigated by leading the water round the edges of the embankment, or by cutting the embankment itself; while the wheat, barley, sugar-cane, and poppy crops of the adjacent high lands can be watered by a lift. Wells are not used for irrigation.

There is no tendency towards the formation of a distinct landless labouring class. Such a class formerly existed in the *kamids* or bondsmen, the nature of whose servitude is described in the article on Hazaribāgh District (vol. v. pp. 376, 377). This system, however, was put an end to in the Santāl Parganās by the late Sir George Yule, when Commissioner of the Bhāgalpur Division, who ordered the cancellation of all *kamid* bonds, and sent the *kamids* to work upon the railway then under construction. The agricultural day-labourers, while finding their regular employment in working for others, are not, as a class, absolutely landless, and generally have small patches of cultivation of their own. Of such labourers there are two kinds, known as *krishāns* and *bhagiār*. The *krishān* either uses his own agricultural implements and takes one-half of the produce, or uses his employer's implements and gets only one-third. In any case, the employer pays the rent and provides the seed. The *bhagiār* works on less advantageous terms, as he not only contributes his personal labour and the use of his own agricultural implements, but also finds the seed, and only receives one-half of the produce.

In consequence of the enhanced demand for labour on the railway and public works, wages have risen materially of late years. Prices of food-grains and of all agricultural produce have also risen. Common rice in 1883-84 sold at the rate of 19½ *seers* per rupee, or 5s. 9d. per cwt.; and wheat at 14½ *seers* per rupee, or 7s. 9d. per cwt. These prices are rather above the average, owing to the year being one of deficient rainfall.

Natural Calamities.—Blight of a serious kind is not known in the Santāl Parganās. Owing to the completeness of the natural drainage, floods are almost impossible over a large area; on the rare occasions on which the crops in the alluvial tract have been injured by flood, the loss thus caused was more than compensated by the increased yield of the high lands. Drought caused considerable distress in the Santāl Parganās in 1866, and again in 1874. In the former year the price of rice rose in July to 7½ *seers*, and in August to 6½ *seers* for the rupee; in the latter year the highest price was 10 *seers*. The fact of rice rising to 10 or 14 *seers*, or paddy to 20 or 25 *seers*,

would indicate the approach of famine, and relief measures would become necessary. It has been remarked that abundant crops of wild fruit are usually concomitants of famine years; and this was the case both in 1866 and in 1874. The *mahuá* tree, which is very common in the Santál highlands, yielded in 1874 a bounteous crop of edible blossoms and seeds; and the mango was also plentiful, and formed a sensible addition to the food supply of the people, who live much on wild fruits and herbs. In 1866, the people in this District, as in other parts of Behar, were forced by want to eat the mangoes while still unripe, and thousands of deaths by cholera were the result. In 1874, relief was afforded on such a scale that the fruit was allowed to ripen before being plucked, and there was no outbreak of disease.

Commerce and Trade, etc.—The trade of the District is carried on by means of permanent markets. The chief exports are rice, Indian corn, oil-seeds, *tasar*-silk cocoons, lac, small-sized timber, hill bamboos, and stone. The imports include European piece-goods, salt, and brass or bell-metal utensils for household use. The principal mart, both for railway and river trade, is SAKHIGANJ, on the Ganges. This place is most favourably situated on the deep channel of the river, which flows at all seasons close under the town, and the railway station is quite near. RAJMAHAL, on the loop-line of the East Indian Railway, is another important mart. Both Sakhiganj and Rajmahal mainly depend upon their through traffic. They are, in fact, depôts, where the agricultural produce of the trans-Gangetic Districts of Maldah, Purniah, and Bhágalpur is collected for transmission by rail to Calcutta. The manufactures of the District are insignificant. Iron is roughly smelted; coarse cloth is woven, silk-spinning is carried on, a few bell-metal utensils are made, and indigo is manufactured on a small scale. There are altogether about 500 miles of road in the Santál Parganás; and the District is traversed on the east by the loop-line, and on the west by the chord-line of the East Indian Railway—the total length of both lines, including a portion of the small branch connecting Madhupur with the Karharbári collieries, being about 130 miles. Coal is found in the District, but of such inferior quality that all attempts made to work it have failed. Stone is quarried by an English firm under leases from Government and the *zamindárs*, and exported down the Ganges to Calcutta for use as road-metal.

Administration.—In 1860-61, the total revenue of the Santál Parganás amounted to £22,680, and the expenditure to £16,845. In 1870-71 the revenue was £38,901, and the expenditure £14,391. In 1883-84 the five main items of Government revenue aggregated £45,437, made up as follows:—Land revenue, £22,556; excise, £11,753; stamps, £9662; registration, £740; municipal taxes, £721. Cost of civil administration, £16,438. Number of criminal,

civil, and revenue courts in 1870, 10; in 1883, 17. The Deputy Commissioner is also the District Judge.

The police of the Santál Parganá was organized in 1856 under what was called the 'no police' system, according to which the village officials alone perform police duties. The regular police system was, however, partially introduced in 1863-64; and in 1881 extended to the rest of the District, except the Dáman-i-koh, and Dumká and Jamtára Sub-divisions, where the village system still exists unimpaired. The reserve police force of Western Bengal, 100 strong, is now stationed at Dumká, which has also become the training ground for the police of the western part of the Province, the police of other Districts being sent there to be drilled in batches of 10 men from 10 Districts at a time. In 1883 the regular and municipal police force numbered 392 men of all ranks, maintained at a total cost of £6724. The rural police or village watch, including the Ghátwáls and Paháriás, numbered 3891, maintained at an estimated cost in money or rent-free service lands of £4868. The total machinery, therefore, for the protection of person and property consisted of 4283 men of all ranks, giving 1 man to every 1·27 square miles of area or to every 336 of the population. The total estimated cost was £11,592, equal to an average of £2, 2s. 6d. per square mile and 1½d. per head of population. In 1883 the police conducted 3062 cases of all kinds, the proportion of convictions to persons brought to trial being 40·6 per cent.

Dákdílí or gang-robbery is very uncommon, the explanation being that the people of the District are so poor that there is no inducement to this particular crime. There was 1 jail and 1 lock-up in the Santál Parganá in 1883. The average daily jail population in the Dumká and Godda jails was 20 prisoners.

Education has made rapid strides in the Santál Parganá during the last few years. In 1864, there was not a single Government school in the District; in 1870-71, there were only 47, and in 1871-72, 42 Government and aided schools, attended by 1169 pupils. In 1872-73, owing to the admission of village *pathsálas* to the benefit of the grant-in-aid rules, the number of Government and aided schools had risen to 101, with 2206 pupils. In 1883, when Sir George Campbell's education reforms had received their full development, the number of primary schools in the Santál Parganá under inspection by the Education Department had increased to about 975, with about 17,000 pupils. Of these, 148 were under missionary management. The Census Report of 1881 returned only 8850 boys and 504 girls as under instruction; besides 17,310 males and 661 females able to read and write, but not under instruction.

For administrative purposes, the Santál Parganá are divided into 6 Sub-divisions, namely, (1) Dumká, (2) Rájmahál, (3) Deogarh, (4)

Pikaur, (5) Jamtará, and (6) Godda. There are 32 fiscal divisions (*parganas*) in the District. The gross municipal income of Deogarh and Sdhibganj (the only municipalities in the Santál Parganás) amounted in 1883 to £1216, of which £721 was derived from taxation; average incidence of taxation, 1s. per head of the population (14,296) within municipal limits.

Medical Aspects.—The climate of the Santál Parganás varies in the different tracts which have been referred to in describing the physical features of the District. The alluvial strip of land has the damp heat and moist soil characteristic of Bengal; while the undulating and hilly portions are swept by the hot westerly winds of Behar, and resemble in their rapid drainage and dry subsoil the lower plateau of Chutiá Nágpur. In this undulating tract the winter months are very cool, but the hot season is correspondingly trying. The average annual rainfall is 60·23 inches. Rainfall in 1883–84, 47·84 inches, or 12·39 inches below the average. No thermometrical returns are available. The prevailing endemic diseases of the District are fevers of the ordinary type, bowel complaints, and skin diseases. The hill tracts of Rájmahál are very malarious. Epidemics of cholera and small-pox break out from time to time, but have been for the most part confined to the town of Deogarh. There are 5 charitable dispensaries in the Santál Parganás, which afforded medical relief in 1883 to 7569 in-door and out-door patients. [For further information regarding the Santál Parganás, see *The Statistical Account of Bengal*, by W. W. Hunter, vol. vi. pp. 265 to 384 (Trubner, 1877); also the *Bengal Census Report* for 1881; and the several Administration and Departmental Reports of the Government of Bengal.]

Santáls, The.—An aboriginal Kolarian tribe, inhabiting a tract of country forming a strip of Bengal; about 350 miles in length, extending from the Ganges at Bhágalpur to the Baitarani river in Orissa. The Imperial Census Report of 1881 does not return the number of Santáls to be found throughout India; but, with the exception of a small body of about 7000, who have emigrated to Assam as coolies on the tea estates, or as labourers, and a few isolated cases of individuals scattered elsewhere, the whole Santál population inhabits the strip of Bengal above cited. The Census Report of Bengal for 1881 returns the total Santál population of the Province, excluding Christian converts, or any who may have embraced the faith of Islam, at 1,087,202, comprising Hindus 203,264, and non-Hindus 883,938. A little more than one-half, namely, 546,694, or 50·3 per cent. (of whom only 9148 are Hindus), are found in the single District of the Santál Parganas, which, however, as explained below, and in the District article, is not the original home of the race, but that in which they have settled during the present century. The following table, compiled from the Bengal Census

Report of 1881, shows the distribution of the Santáls in the different Bengal Districts in 1881, classified into Hindus and non-Hindus :—

SANTALS IN BENGAL IN 1881.

DISTRICTS.	Non-Hindus	Hindus	TOTAL
Santál Parganas,	537,546	9,148	546,694
Manbhum,	42,700	86,403	129,103
Midnapur,	112,062	565	112,627
Bánkura,	84,559	20,034	104,593
Hazárbágh,	56,598		56,598
Singhbhum,	648	51,954	52,602
Bírbhum,	14,172	726	14,898
Bhágálpur,	13,384	42	13,426
Rardwán,	6,418	5,806	12,224
Monghyr,	6,938		6,938
Balasor,	4,206	339	4,545
Orissa Tributary States,	633	922	1,555
Other Bengal Districts,	4,074	27,325	31,399
Grand Total,	883,938	203,264	1,087,202

The following paragraphs, quoted in a slightly condensed form from Colonel E. T. Dalton's *Descriptive Ethnology of Bengal*, describe generally the history of the Santáls, so far as ascertained, their physical appearance, habits, and mode of life.—

History.—The Santál Parganá or Santálá, said to contain upwards of 200,000 Santáls [546,694 in 1881], may now be regarded as the nucleus of the Santál race, though it does not appear to have been one of their original seats. Dr. Buchanan-Hamilton, in describing the hill tribes of Bhágálpur and its vicinity, makes no mention of Santáls. The aboriginal tribes he fell in with are called "Malais," the Rájmahál hill-men proper and their kindred, who are a Dravidian people. It is singular that no old colonies of Santáls or other Kolarian tribes are found between the Himálayas and the Ganges. The Santal Settlements that now border on that river or skirt the Rájmahál hills are readily traced back to more southern Districts; and their own traditions hardly support the theory of their northern origin. Indeed, when we find that the Kolarian races have left their trail in Assam; that it may be followed throughout the Siam States and Burma to the Pegu District, and is faintly discerned in the adjoining islands, that it may be taken up at Point Palmyras and clearly traced along both banks of the Dámodar river till it reaches the hills and table-land of Chutiá Nágpur,—it is scarcely reasonable to assume that they have all come direct from the Himálayas. The Dámodar, rising in Palámau, divides the Hazárbágh and Chutiá Nágpur plateaux, and draining the northern face of the one, and the southern face of the other, discharges itself

into the Húglí near the mouth of the latter river. It is the terrestrial object most venerated by the Santáls; and the country that is most closely associated with their name, which they apparently regard as their fatherland, is between that river and the Kasáí. There is no doubt, however, that Santáls colonized parts of Hazáribágh District and of Bírbbhúm at a very remote period, and it is chiefly by migrations from these colonies that the modern Santálía has been formed.

‘In 1832, a considerable impetus was given to the northward movement, in the action taken by Government to secure to the Rájmahál highlanders their possessions in the hills that form the turning-point of the Ganges at Sáhíbganj. To prevent the encroachments of the lowland *samindárs* of Bhágalpur, which were constantly exciting reprisals from the highlanders, a tract of country measuring nearly 300 miles in circumference was separated and marked off by large masonry pillars. Of the land within these pillars the Government was declared to be direct proprietor, and the hill people were informed that their rights in it would be respected so long as they conducted themselves peaceably. But the hill-men only cared for the highlands; and the tract included within the pillars, called the Dáman-i-koh or skirts of the hills, and the valleys running into the hills, were available for other settlers, and were speedily taken up by Santáls. In a few years the Santál population had increased from 3000 to 83,000 souls, when the colony received a check by the Santál insurrection of 1854.

‘For a history of this rebellion, and the causes that led to it, the reader may be referred to the *Annals of Rural Bengal*. The Santáls, starting with the desire to revenge themselves on the money-lenders who had taken advantage of their simplicity and improvidence, found themselves arrayed in arms against the British Government. It was not without bloodshed that the insurrection was suppressed; but it led to their being re-established under a more genial administration in what are now called the Santál Parganas. In the Dáman-i-koh, their own form of self-government is to some extent restored to them. The villages are farmed to the head-men, called *manjhis*, who are also the sole guardians of the peace, a system that had been already introduced with success into the Kolhan of Singbbhúm.

Migratory Habits.—‘In marked contrast to the Kolarians of the Munda and Ho Divisions, the Santáls, as a rule, care little for permanently locating themselves. A country denuded of the primeval forest which affords them the hunting grounds they delight in and the virgin soil they prefer, does not attract them; and when, through their own labour, the spread of cultivation has affected this denudation, they select a new site, however prosperous they may have been on the old, and retire into the backwoods, where their harmonious flutes sound

sweeter, their drums find deeper echoes, and their bows and arrows may once more be utilized. The traditions of their ancient migrations are rendered obscure by the succession of dissolving views to which this nomadic habit introduces us, but they nevertheless tenaciously cling to a wild and remote tradition of their origin. Though much scattered and intermingled with other races whose creeds and customs they have partially adopted, they are still characterized by many old practices; and they are one of the tribes which has preserved the form of speech that in all probability predominated in the Gangetic Provinces before the Aryan conquest.

But though prone to change, the Santals are not indifferent to their personal comfort, and are more careful in the construction of their homesteads and villages than their cognates. Their huts, with carefully formed mud walls and well-raised plinths and snug verandahs, have a neat and, owing to their love of colour, even a gay appearance. They paint their walls in alternate broad stripes of red, white, and black,—native clays and charcoal furnishing the pigments; moreover, the houses are kept perfectly clean, and, by means of partitions, decent accommodation for the family is provided.

For the sites of their villages they generally seek isolation, and would gladly, if they could, exclude all foreigners, especially Brahmins. But as they clear lands that they do not care to retain and render habitable—regions that would otherwise be given up solely to wild beasts—they are soon followed into their retreat by the more crafty and enterprising Hindus; and the result often is they have to submit to or give way to the intruders. It frequently happens that the Hindu immigrant, improving on the Santal cultivation, and making more money by it, obtains from the landlord a lease of the village at a rent the Santal would not think of paying, and so the pioneers of civilisation are prematurely forced to move on.

Physiognomy.—The Santals, like the Khárwárs, belong to, or have mixed much with, the dark races of India. The Cheros, Hos, and Mundas are on the whole fairer, and possess more distinct traces of the Tartar type. The Santals are noticeable for a great vagueness in the chiselling of the features, a general tendency to roundness of outline where sharpness is more conducive to beauty, a blubbery style of face, and both in male and female a greater tendency to corpulency than we meet in their cognates. Their faces are almost round; cheek-bones moderately prominent; nose of somewhat a retrousée style, but generally broad and depressed, mouth large, and lips very full and projecting; hair straight, and coarse, and black. Mr. Mann remarks of them, and I concur in the remark, that their cast of countenance almost approaches the Negro type. "The females," he says, "have small hands and feet, and are ox-eyed, and these are

characteristics which the tribes linguistically allied to them do not possess."

Tribal Divisions.—“The Santals, like the Israelites, are divided into twelve tribes:—(1) Siran; (2) Murma; (3) Marli; (4) Kisku; (5) Besera; (6) Handsa; (7) Tiddi; (8) Baski; (9) Hemtow; (10) Karwâr; (11) Choral; (12) . . . Except No. 11, the above agree with the nomenclature of tribal divisions of Santal tribes in Mr. Mann's work; numbers 1, 2, 3, 4, 6, 7, and 11 with the names of the seven sons of the first parents as given in the *Annals of Rural Bengal*. Numbers 2, 3, 6, 9, and 11 are found in the list of the tribes of the Singhbhum Larkas Kols or Hos. This is remarkable, as the legends of origin handed down among the Larkas have little in common with the traditions of the Santals. Though the former also assign twelve sons to the first parents, these were the primogenitors, not of the various *kôls* or tribes of Hos, but of different families of mankind, including Hindus and Santals, the latter being the offspring of the youngest pair, who, when told to separate from the family, selected pig as their staple food. The names given above include only one to which a meaning is attached, viz. Murma, which signifies the *nilgâi* (Portax vel Antelope pictus); and the Murmas may not kill the animal whose name they adopt, nor touch its flesh.

Village Polity, Festivals, and Religion.—“The polity of the Santals is very patriarchal. In each village there is (1) a *jag-munjhi*, whose most important duty is apparently to look after the morals of the boys and girls; (2) a *paribunduk*, whose business it is to attend to the farming arrangements, and to apportion the lands. He disallows any monopoly of peculiarly fertile rice lands; all must take their share of good and bad. He has to look after the interest of new settlers, and to provide for guests, levying contributions for that purpose on the villagers. All the offices are hereditary; when a new settlement is formed, the office-bearers are elected, after that the next of kin succeeds. (3) There is a village priest who is called *kâñj* (कांज, vulgo झंज). This is a word of Sanskrit derivation, and as the Santals have no name in their own language for such an office, it is probably not an original institution. He has lands assigned to him; but out of the profits of his estate he has to feast the people twice in the year at the festival of the *Sirâi*, held towards the end of March, when the *âl* tree blossoms, and at the *Mi Mari* festival, held in the month of Aswin (September-October), for a blessing on the crops. At the *Sirâi* feast, the harvest home, in December, the *jag-munjhi* entertains the people, and the cattle are anointed with oil and daubed with vermillion, and a share of rice beer (*kâñjâ*) is given to each animal. Every third year in most houses, but in some every fourth or fifth year, the head of the family offers a goat

to the sun-god, Singh Bonga, for the prosperity of the family, especially of the children, "that they may not be cut off by disease, or fall into sin." The sacrifice is offered at sunrise, on an open space cleaned and purified for the occasion. A very important distinction is observed by all the Kolarians in the motives of the sacrifices to the supreme deity, and of those by which the minor gods are propitiated. To Singh Bonga the sacrifice is to secure a continuance of his mercies, and for preservation. The other deities are resorted to when disease or misfortune visits the family, the sacrifice being to propitiate the spirit who is supposed to be afflicting or punishing them.

'Ancestors are worshipped, or rather their memory is honoured, at the time of the *Sohrai* festival, and offerings are made at home by each head of a family. In the meantime the *naijd* propitiates the local devils or *bhuts*. In many villages the Santals join with the Hindus in celebrating the *Durgá Pūja*, the great festival in honour of Devi, and the *Holi*, in honour of Krishna. Their own priests take no part in the ceremonial observances at those Hindu feasts, which are left to the Brāhmans.

'The person or persons who have to offer sacrifices at the Santal feasts prepare themselves for the duty by fasting and prayer, and by placing themselves for some time in a position of apparent mental absorption. The beating of drums appears at last to arouse them; and they commence violently shaking their heads and long hair, till they work themselves into a real or apparent state of involuntary or spasmodic action, which is the indication of their being possessed. They may then give oracular answers to interrogatories regarding the future, or declare the will of the spirit invoked or about to be propitiated. When the demoniacal possession appears to have reached its culminating point, the possessed men seize and decapitate the victims, and pour the blood into vessels ready placed for its reception. Among the Santals in Chutiá Nágpur, Singh Bonga, or the sun, is the supreme god, the creator and preserver. The other deities are Jāhir Era, Monika, and Marang Búrú, who are all malignant and destructive. In the eastern Districts the tiger is worshipped, but in Rāmgarh only those who have suffered loss through that animal's ferocity condescend to adore him. If a Santal is carried off by a tiger, the head of the family deems it necessary to propitiate the Bāgh Bhūt, the tiger; and to be sworn on a tiger skin is the most solemn of oaths.

'Santals who, under the example and precept of Bengali Hindus, have abjured some practices considered impure by the latter, are called Sat Santals, that is, pure Santals; but there is a national antagonism between the Santals and the Hindus that prevents any close fraternization or communion between the races. The Santals are not over

particular about food, but nothing will induce them to eat rice cooked by a Hindu, or even by a Bráhmán. Unfortunately, during the famine of 1866 this was not known to us. The cooks who prepared the food distributed at the relief centres were all Bráhmáns, and it was supposed that this would suit all classes; but the Santáls kept aloof, and died rather than eat from hands so hateful to them. They have no tradition to account for this bitter feeling. The animosity remains, though its cause is forgotten.

Social Customs.—‘The Santál parents have to undergo purification five days after child-birth; a kind of gruel is prepared, and after a libation to Singh Bonga or Marang Búrú, it is served out to the mother and the other members of the family. An eldest son is always named after his grandfather, other children after other relations. The Santáls have adopted as a rite the tonsure of children, and do not appear to recognise the necessity for any other ceremonial observance till their marriage when adult. Child marriage is not practised.

‘There is no separate dormitory for the boys and girls in a Santál village. Accommodation is decorously provided for them in the house of the parents, but the utmost liberty is given to the youth of both sexes. The old people, though affecting great regard for the honour of the girls, display great confidence in their virtue. Unrestrained, they resort to markets, to festivals, and village dances in groups; and if, late in the evening, they return under escort of the young men who have been their partners in the dance or have played to them, no harm is thought of it.

Music.—‘The peculiar emblem of the Santáls should be the flute; they are distinguished from all people in contact with them by their proficiency on that instrument. Made of bamboo, not less than one inch in diameter, and about 2 feet in length, their flutes are equal in size to the largest of our concert flutes, and have deep rich tones. This faculty of playing the flute and a general knowledge of singing and dancing were, they say, imparted to them by their first parents; and it was also by their first parents that they were taught the mysteries of brewing rice-beer, and they therefore consider there can be no great harm in freely indulging in it.

Dances.—‘There is always reserved an open space in front of the *jag-mánjhī’s* house as a dancing place. To this the young men frequently resort after the evening meal. The sound of their flutes and drums soon attract the maidens, who smooth and adjust their long hair, and, adding to it a flower or two, blithely join them. It is singular that, in this national amusement of the Santáls, we have handed down to us a most vivid living representation of one prominent scene in the sports of Krishna in Braja and Brindában. There is

nothing in modern Hinduism that at all illustrates the animated scenes so graphically delineated in the *Purānas*; but the description of the *Rāsa* dance in chapter xiii., book v., of the *Vishnu Purāna* might be taken literally as an account of the Santāl *Jumhir*. We have in both the maidens decked with flowers and ornamented with tinkling bracelets, the young men with garlands of flowers and peacocks' feathers, holding their hands and closely compressed, so that the breast of the girl touches the back of the man next to her, going round in a great circle, limbs all moving as if they belonged to one creature, feet falling in perfect cadence, the dancers in the ring singing responsive to the musicians in the centre, who, fluting, drumming, and dancing too, are the motive power of the whole, and form an axis of the circular movement. Thus, as the pivot for the dances, sometimes sported Krishna and his favourite companions, "making sweet melody with voices and flutes;" but more frequently they took their places in the ring, "each feeling the soft pressure of two maidens in the great circling dance." We are told that Krishna, when he thought the lovely light of autumn propitious for the *Rāsa* dance, commenced singing sweet low strains in various measures, such as the Gopīs (milkmaids) loved, and they, as soon as they heard the melody, quitted their homes and joined him. Just so, on a moonlight night, the Santāl youth invite the Santāl maidens. Professor Wilson, in his note on the passages of the *Vishnu Purāna* referred to above, observes that the *Rāsa jātra* is celebrated in various parts of India in the month of Kārtik (October), but that a circular dance of men and women does not form any prominent feature at these entertainments, and he doubts if it ever is performed. In the late autumn months the Kols and Urāons have numerous *jātras*, at which these circular dances are performed by thousands.

Marriage Ceremonies. — 'With such freedom of intercourse, it follows that marriages are generally love matches, and, on the whole, happy ones; but it is considered more respectable if the arrangements are made by the parents or guardians, without any acknowledged reference to the young people. The price to be paid for the girl, averaging five rupees, with presents of cloths to her parents, having been determined on, a day is fixed for a preliminary feast, and afterwards for the marriage itself; and a knotted string, which shows the number of days that intervene, is kept as a memorandum. Each morning one of these knots is removed by the impatient lover, and, when the last is loosened, the bridegroom and his friends, with noisy music, set out for the abode of the bride. As they approach the village, the *jag-mānjhi* comes out to meet them, attended by women with water to wash the feet of the guests, who are then escorted to the house of the bride, and the two mingling together merrily sing, dance, and feast

in front of the bride's chamber. At the last quarter of the night, the bridegroom makes his appearance, riding on the hips of one of his comrades, and soon after the bride is brought out by a brother or brother-in-law in a basket. Then comes the inevitable *sindra dān*. The groom daubs his lady-love on the crown and brow very copiously with vermilion (*sindūr*), and the assembled guests applaud with cries of *hari bol*. The bride and bridegroom, having fasted all day, now eat together, and this is supposed to be the first time that the girl has sat with a man at her food. It is creditable to the Kolarians that this custom has been retained through ages, notwithstanding the derision with which it is viewed by all Hindus. On the following day, before the party breaks up, the young people are thus admonished by one of the sages:—"Oh boy! oh girl! you are from this day forth to comfort each other in sickness or sorrow. Hitherto you have only played and worked (as directed), now the responsibility of the household duties is upon you; practise hospitality, and when a kinsman arrives wash his feet and respectfully salute him." No priest officiates at a Santāl marriage. The social meal that the boy and girl eat together is the most important part of the ceremony. By this act the girl ceases to belong to her father's tribe, and becomes a member of her husband's family. Santāls seldom have more than one wife, and she is treated with most exemplary kindness and consideration. Should the husband be for any reason, as her barrenness, induced to seek a second partner during her lifetime, the first wife is never deposed from her position as head of the household; the second wife must obey her and serve her.

Hunting Expeditions.—'A Santāl in prosperous seasons leads a pleasant life. He is either busy with his cultivation, or playing his flute, or dancing with the girls, or engaged in the chase. He throws himself with ardour into the latter pursuit, and in hunting down beasts of prey he evinces great skill and powers of endurance and indomitable pluck. The Santāls have every year a great hunting festival, in which thousands take part. These expeditions are organized with as much care and forethought as if the hosts engaged in them were about to undertake a military campaign. They take place in the hot season, when the beasts have least cover to conceal themselves in. When the array of hunters reaches the ground on which operations are to commence, they form a line of beaters several miles in length, every man armed with a bow and arrows and a battle-axe, and accompanied by dogs, who, though ugly creatures to look at, appear, like their masters, to be endowed with a true hunting instinct. When they emerge from the woods on open spaces, the game of all kinds that are driven before them suddenly appear. Birds take wing and are beaten down with sticks or shot with arrows; quadrupeds, great and

small, are similarly treated, and in this way deer, pig, jungle-fowl, peafowl, hare, etc., are bagged; but tigers and bears on these occasions of open warfare are generally avoided. These hunting excursions last for four or five days, and at the end of each day the Santals feast merrily on the contents of their bags, and thoroughly enjoy themselves. The rule in regard to possession of an animal killed is that it belongs to him who first wounded it, no matter by whom the *coup de grace* may have been inflicted.

'The Santals employed in the police force are very highly spoken of by an officer who long commanded them. They may not be expert detectives in tortuous cases; but in following up *dakkits*, and attacking them when found, they are far superior to the ordinary Bengali constables, and many instances of their activity and pluck have been related to me. Living as they generally do on the edges of forests, their constitutions are proof against malaria, and they may be employed on outpost duty in localities that are deadly to most people. They have been thus utilized on the Grand Trunk Road in places where the jungle comes down to the road.

Dress.—'The Santals dress better than most of their cognates. This also, it appears, is derived from the instruction of their first parents, who appointed the size of the garments that were to be worn respectively by male and female, but omitted to teach their offspring how they were to be made. They have no weavers among their own people. The women wear ample *sáris*, a large thick cloth, not less than six yards in length, with a gay red border. One-half of this forms the lower garment, secured at the waist, but not so as to impede the free action of the limbs; the other half is passed over the left shoulder, leaving the right shoulder, arm, and part of the breast free, and allowed to hang down in front. It is not, as with Hindu maidens, used also as a veil. The heads of young girls are generally uncovered, displaying a mass of black, rather coarse, but sometimes wavy hair, gathered into a large knob at one side of the back of the head, ornamented with flowers or with tufts of coloured silk.

"'Their arms, ankles, and throats," writes Colonel Sherwill, "are each laden with heavy brass or bell-metal ornaments. I had a quantity of these ornaments weighed, and found that the bracelets fluctuated from two to four pounds; and the entire weight sustained by one of these belles was ascertained to be no less than thirty-four pounds of brass or bell-metal. The average may be estimated at about twelve pounds."

'In *Funeral Ceremonies* the Santal varies from the practice of the Ho and Munda tribes. The body is borne away on a *chárpaí* or cot by kinsmen; and when it reaches a cross-road, some parched rice and cotton-seed are scattered about, as a charm against the

malignant spirits that might throw obstacles in the way of the ceremony. It is then taken to a funeral pile near some reservoir or stream, and placed on it. The son or brother is the first to apply fire to the body, by placing a piece of burning wood on the face of the corpse; and soon all that is left are ashes and a few charred fragments of bones of the skull, which are carefully preserved. Towards evening, it is customary for a man to take his seat near the ashes with a winnowing fan, in which he tosses rice till a frenzy appears to seize him, and he becomes inspired and says wonderful things. After the incineration, the immediate relatives of the deceased have to undergo a quarantine, as impure, for five days. On the sixth they shave themselves and bathe, and sacrifice a cock. In due course, the bones that have been saved are taken by the nearest of kin to the Dámodar. He enters the stream bearing the sacred relics on his head in a basket; and selecting a place where the current is strong, he dips, and commits the contents of his basket to the water, to be borne away to the great ocean as the resting-place of the race. All inquirers on the subject appear to have arrived at the conclusion that the Santáls have no belief in a future state. The pilgrimage to the Dámodar with the remains is simply an act of reverence and affection, unconnected with any idea that there is a place where those who have left this world may meet again. It is to be observed that when the Santáls in disposing of their dead differ from the Mundas, they approximate to the Bráhmānical custom. It is, in fact, a rough outline of the Bráhmān ritual, and only wants filling in. The halting at cross-roads and the scattering of rice, the application of fire first to the head by a relation, the collecting of the charred bones, especially those of the head, are all included in the ceremonies enjoined on Bráhmāns and orthodox Hindus. The Bráhmān, like the Santál, carefully preserves the bones in an earthen vessel, he is ordered to bury them in a safe place till a convenient season arrives for his journey to the sacred river—in his case, the Ganges—where he consigns the vessel with its contents to the waters.

Sántalpur-with-Chádchat.—Native State in the Political Superintendency of Pálanpur, Gujarát, Bombay Presidency. The two Subdivisions of Sántalpur and Chádchat together form an estate ruled by a number of petty chieftains. Bounded on the north by the Morwára and Suigám estates, on the east by the States of Wáráhi and Rádhanpur, and on the south and west by the Rann of Cutch. The two estates measure together about 37 miles in length, and 17 miles in breadth. Area, 440 square miles. Population (1881) 20,466; estimated yearly revenue, £3500. The country is flat and open. *Ghaiss* or self-produced salt is found in large quantities. There are no rivers, but

many ponds exist, which in normal seasons retain water till March, when the inhabitants have to depend upon wells for their supply. Fever is common. The holders of this State are Járeja Rájputs, kinsmen of the Ráo of Cutch, by whom the country was conquered about 400 years ago. The ruling family hold no *sanad* authorizing adoption; in matters of succession they follow the rule of primogeniture. One school with 49 pupils in 1882-83.—See also CHADCHAT.

Santapilly (*Sentapilli*).—Village and lighthouse in Vizagapatam District, Madras Presidency.—See CHANTAPILLI.

Sántipur.—The most populous town in Nadiyá District, Bengal; situated on the river Huglí, in lat. $23^{\circ} 14' 24''$ N, and long. $88^{\circ} 29' 6''$ E. Population (1881) 29,687, namely, males 13,708, and females 15,979. Hindus number 20,701; Muhammadans, 8945; and 'others,' 41. Municipal income (1883-84), £2288, of which £1855 was derived from taxation; average incidence of taxation, rs. 2½d. per head. Sántipur is famous for its cloth manufactures, which were at first spread throughout the whole District, but afterwards became centralized in this town, owing to its being the site of a commercial residency and the centre of large factories under the East India Company. Considerable local trade. The *Rás-játrá* festival, in honour of Krishna, is celebrated at Sántipur on the day of the full moon in Kártik (October or November). The fair is visited by about 25,000 persons, and continues for three days, on the last of which there is a procession along the high-road. Sántipur is also a celebrated bathing-place.

San-ywe (*Tsan-rwe*).—The southern township of Tharawadí District, Pegu Division, Lower Burma. In the east, the country is mountainous and forest-clad, producing teak and other valuable timber; in the west, it is low and liable to inundation. The township is traversed from north to south by the Hlaing river, which receives drainage from the Pegu Yoma range, and communicates with the Irawadí on the west. Population (1881) 70,430. Land revenue, £10,876. Head-quarters at San-ywe village, containing a court-house and police station; population (1881) 615.

Sáoli.—Town in Chánda District, Central Provinces; situated in lat. $20^{\circ} 5' N$, and long. $79^{\circ} 50' E$, 7 miles east of Múl. Population (1881) 3680, namely, Hindus, 3508; Muhammadans, 28; Jains, 9; and non-Hindu aborigines, 135. Manufacture of cotton cloth; and trade in cotton, cotton cloth, grain, groceries, and *gúr*. Sáoli has a weekly market, and contains a Government school.

Sáoligarh.—State forest, yielding teak and *sal*, in the north and north-west of Betúl District, Central Provinces. Comprises several blocks of hills between the Moran river on the east and north, and Rájáborá on the west. Area, 130 square miles.

Sáoner (*Sondár*).—Thriving town in Nágpur District, Central Provinces; situated in lat. $21^{\circ} 23' N.$, and long. $78^{\circ} 58' E.$, 24 miles north-west of Nágpur city, near the main road to Chhindwára, with which place a good branch road connects the town. Population (1881) 5023, chiefly agricultural. Hindus number 4739; Muhammadans, 232; Jains, 7; and non-Hindu aboriginal tribes, 45. Municipal income (1882-83), £159; average incidence of taxation, $7\frac{1}{2}d.$ per head. The Kolár river flows through the town, which stands in a fertile and well-cultivated plain. It has a circular market-place, with large masonry platforms, from which two broad metalled roads lead south-west and west through the most populous quarters, and are connected by a third street of similar character. Chief manufactures—cotton cloth, which is largely exported, and an inferior snuff, made by the Musalmán population. A large cattle fair is held weekly. Sáoner has a travellers' bungalow (rest-house), handsome *sardí* (native inn), police station, and school, in which English is taught. The fort in the centre of the town, now ruined, must once have been large and strong. Tradition relates that it was built by Gauli chiefs before the days of the Gonds; but for many generations Sáoner has belonged to the Gond family of Swasthánk.

Sáorgaon.—Village in Kátol *tahsíl*, Nágpur District, Central Provinces. Population (1881) 3241, namely, Hindus, 3039; Muhammadans, 172; Jains, 9; and non-Hindu aborigines, 21.

Saptagrám.—Ruined town in Húglí District, Bengal.—*See* SATGAON.

Sar.—Lake in Purí District, Bengal. A back-water of the BHARGAVÍ river, situated to the north-east of Purí town; its length from east to west is 4 miles, and its breadth from north to south 2 miles. Lat. (centre) $19^{\circ} 51' 30'' N.$, long. $85^{\circ} 55' E.$ This lake has no outlet to the sea, and is separated from it by sandy ridges, which are entirely destitute of inhabitants. The Sar is not used to any extent for fisheries; its water, however, is employed for irrigation when the rainfall proves deficient.

Sará.—*Parganá* in Hardoi District, Oudh; bounded on the north by Alamnagar, on the east by Mansúr-nagar, on the south-east and south by Gopámau and Báwan, and on the west by Sháhábád. A *parganá* with a fertile soil, and a large area occupied with *jhills* and marshes. Area, 90 square miles, of which 49 are cultivated. The main products are wheat and barley, which occupy nearly one-half the total cultivated area. Population (1881) 34,527, namely, 33,140 Hindus and 1387 Muhammadans. Of the 85 villages in the *parganá*, 59 are owned by Chamár Gaur. Only 1 of these villages is held in *tilukdárí* tenure, 40 in *samlukdárí*, 43 in imperfect *pattidárí*, and 3 in *bhilyachdára* tenure. Government land revenue, £5612;

equal to an average of 3s. 7d. per cultivated acre, or 2s. per acre of total area.

Sárágaj (or *Langla*).—Hill range in the south of Sylhet District, Assam, running northwards as a spur from the State of Hill Tipperah. Estimated area, 81 square miles; height above sea-level, 1100 feet.

Saragúr (*Sargúr*).—Municipal village in Mysore District, Mysore State; situated in lat. $12^{\circ} 0' 10''$ N., and long. $76^{\circ} 25'$ E., on the right bank of the Kabbani river, 36 miles south-west of Mysore city. Since 1870, the head-quarters of the Heggaddevankot *táluk*. Population (1871) 1626; not separately returned in the Census Report of 1881. Owes its administrative importance to its healthy position, the neighbourhood being free from jungle.

Saráhán.—Town in Bashahr (Bussahir) State, Punjab; situated in lat. $31^{\circ} 30'$ N., and long. $77^{\circ} 50'$ E., in a wooded amphitheatre, 3 miles from the left bank of the Sutlej (Satlaj), and backed up by the snow-clad summits of a spur of the Himálayas. Thornton describes it as the summer residence of the Bashahr Rájá. Tasteful houses in Tibetan style, with pent-roofs, balconies, and intricate carved wood-work. Handsome temple dedicated to the goddess Káli. Northern limit of the Bráhmans, none of whom reside to the north of the town. Elevation above sea-level, 7246 feet.

Sarái Aghat.—Town and ruins in Etah District, North-Western Provinces. Distant from Etah town 43 miles south-east, from SANKISA three-quarters of a mile north-west. Lies on either side of a ravine of the Káli Nadi. Population (1881) 2880. *Bázár* of well-built houses, leading to a central market-place. Police outpost station, village school. Trade in cotton, grain, and indigo seed. Founded towards the close of the 17th century by three Afghán leaders, who came from Farúkhabád District, and built the Sarai Abdur Rasúl and a mosque. West of the village stands a lofty and extensive mound, 40 feet in height and about half a mile in diameter, the northern portion being built over with brick houses. It bears the name of Aghat, derived from Muni Agastiya, the mythical regenerator of the Deccan. The houses on the top have been built of bricks from the mound, part of which has been honeycombed by excavations in search of building materials. Images of Buddha, together with gold, silver, and copper coins of all ages, frequently occur. In 1843, about £2000 worth were found among the ruins. Aghat probably formed part of the ancient city of SANKISA.

Sarái Akíl.—Town in Chail *tahsil*, Allahábád District, North-Western Provinces; situated in lat. $25^{\circ} 22' 43''$ N., and long. $81^{\circ} 33' 15''$ E., 20 miles west-south-west of Allahábád city. Population (1881) 2823. The town is noted for its colony of Thatheras, whose brass-work and metal ornaments have more than a local reputation. Bi-weekly markets on Tuesdays and Saturdays. Post-office, police station,

and village school. A small house-tax is levied for police and conservancy purposes, realizing £58 in 1881-82.

Sarāikālā.—Political estate in Singhbhūm District, Bengal, lying between $22^{\circ} 33'$ and $22^{\circ} 54' 30''$ N. lat., and between $85^{\circ} 53'$ and $86^{\circ} 13'$ E. long. Area, 457 square miles. Population (1872) 66,347, inhabiting 368 villages or townships (*mauzds*), and 13,675 houses. Not separately returned in the Census Report of 1881.

Sarāikālā.—Village in Sarāikālā estate, Singhbhūm District, Bengal. Lat. $22^{\circ} 41' 52''$ N., long. $85^{\circ} 58' 28''$ E. Weekly market for local produce and articles of trade. Bengali school.

Sarāi Kheta.—Village in Khutahān *tahsil*, Jaunpur District, North-Western Provinces, and station on the Oudh and Rohilkhand Railway; situated in lat. $25^{\circ} 58' 16''$ N., and long. $82^{\circ} 43' 21''$ E., 6 miles east of Khutahān town. Population (1881) 2921. Bi-weekly market, and large *sardī* (native inn). Post-office.

Sarāi Mīr.—Town in Azamgarh District, North-Western Provinces. Population (1881) 5238, namely, Hindus 2993, and Muhammadans 2245. A small municipal revenue is raised for police and sanitary purposes.

Sarāi Sāleh.—Town in Haripur *tahsil*, Hazāra District, Punjab. Population (1881) 3533. Stands in the Haripur plain, of which it forms the ancient commercial centre. Considerable local traffic. Prosperous colony of weavers. Manufacture of brass and copper vessels. Large cultivation and export of turmeric. Goldsmiths from this place have been in the habit for generations of visiting Afghānistān and Central Asia in pursuit of their trade.

Sarāi Sidhu.—Northern *tahsil* of Mūltān (Mooltan) District, Punjab; consisting of a lowland strip on either bank of the Beas (Bīās) river, together with an extensive tract of barren upland. Area, 1752 square miles, with 299 towns and villages, and 11,361 houses. Number of families, 16,147. Population (1881) 80,012, namely, males 44,535, and females 35,477. Average density of population, 46 persons per square mile. Classified according to religion, the population consists of—Muhammadans, 66,796; Hindus, 13,084; Sikhs, 126; and Christians, 6. Of the 299 towns and villages, 252 contain less than five hundred inhabitants; 35 between five hundred and a thousand; and 12 between one thousand and five thousand inhabitants. Of a total average cultivated area of 99 square miles, or 63,561 acres, for the five years ending 1881-82, wheat occupied 40,639 acres; *jōār*, 4275 acres; gram, 2806 acres; barley, 2386 acres; and cotton, 2025 acres. Revenue of the *tahsil*, £10,184. The local administration is in the hands of a *tahsildār*, who presides over 1 civil and 1 criminal court; number of police circles (*thānds*), 3; strength of regular police, 77 men; village watch or rural police (*chāukīdārs*), 89.

Sarai Sidhu.—Town in Multán (Mooltan) District, Punjab. Lat. $30^{\circ} 35' 30''$ N., long. $72^{\circ} 1'$ E.

Sáran.—District in the Lieutenant-Governorship of Bengal, lying between $25^{\circ} 40'$ and $26^{\circ} 38'$ N. lat., and between $83^{\circ} 58'$ and $85^{\circ} 14'$ E. long. Area, 2622 square miles. Population (1881) 2,280,382 souls. Sáran forms one of the north-western Districts of the Patná Division. It is bounded on the north by the District of Gorakhpur in the North-Western Provinces; on the east by the Bengal Districts of Champáran and Muzaffarpur, the boundary line being formed by the river Gandak; on the south by the Ganges, which separates it from Sháhábád and Patná Districts; on the south-west by the District of Azimgarh in the North-Western Provinces, the Gogra forming the boundary line; and on the west again by Gorakhpur District. The administrative head-quarters are at CHAPRA, which is also the most populous town of the District.

Jurisdiction.—Sáran formerly constituted one District with Champáran. The revenue areas of the two Districts were not finally separated until 1866, but the magisterial jurisdictions were first divided in 1837. The Judge of Sáran still holds sessions at Motihári in Champáran. The Sub-division of Sewán was opened in 1848, and a second Sub-division at Gopálganj was sanctioned in 1875.

Physical Aspects.—Sáran forms a vast alluvial plain, bounded on three sides by the great rivers Ganges, Gandak, and Gogra (Ghagra), and intersected by numerous *nadls* or water-channels, which flow in a south-easterly direction, and carry off the drainage of the District. The rivers run on a higher level than the adjacent country, which is therefore liable to inundation when they overtop their banks. Beneath these high banks lie the basins in which the surface drainage primarily collects, to be discharged into the running channels at a lower stage in their course. The District has the shape of an isosceles triangle. The base, which is very irregular, lies to the north-west, one of the sides is formed by the Gandak, and the other by the Gogra and the Ganges; while the apex is at the south-east corner, where the Gandak and the Ganges join at Sonpur. From this spot, the levels slope very gently up towards the western parts of the District. Kochai Kot, in the north-west corner, is 222 feet above mean sea-level, while Sonpur is only 168 feet. The whole District is beautifully wooded, and mango-groves are very numerous. The lower levels are but sparingly used for rice cultivation; high rice lands predominate, and on these indigo, opium, wheat, barley, and several kinds of pulse are also grown. The soil is in many places saliferous, and saltpetre is extracted by the Núnijás, a poor and hardy caste. There are no hills in Sáran.

The only rivers which are navigable all the year round are the three

great streams already mentioned—the GANGES, GANDAK, and GOGRA. Among the smaller *nadis*, many of which dry up altogether in the hot weather, are the Sundí or Dáhá, the Jharáhi, the Gandakí, the Gangrí, the Dhandí, and the Khatsá, all of which ultimately fall into the Gogra or Ganges. Alluvion and diluvion are constantly taking place along the banks of the large rivers. One bank of the river, on which the current strikes, is generally high and abrupt, while the other is shelving; but these characteristics may be reversed in a short space of time. The high bank is gradually eaten away, and the current then turns to the opposite side, where a similar process is repeated. Large sandbanks form in the bed of the river one year and are swept away the next, sometimes making changes in jurisdiction necessary. Thus, in 1872, an alteration in the deep stream of the Ganges transferred seven alluvial estates (*didrás*) from Sárán to Azimgarh District in the North-Western Provinces. The drainage of the District is from north-west to south-east, and is carried off by the many small *nadis* into the larger streams. When the rainfall is unusually heavy, these *nadis* are unable to contain all the water, and large tracts of cultivated ground are inundated. The consequences are specially disastrous when the mouths of the *nadis* are stopped by high floods in the great rivers into which they flow.

There is very little jungle in Sárán, and hardly any forest products. The lac insect is found on the *pfál* tree, and it is estimated that about 200 *maunds* of the dye are annually exported. Shells are largely gathered for burning into lime. The minerals found in Sárán District are Glauber's salt (*gulbar sora*); and nodular limestone of excellent quality, which is locally used for metalling the roads, and is exported in large quantities to Patná. Large game is not met with, although both tigers and leopards are said to have been at one time very common in the District. Wolves and wild hog are still numerous. Among the game birds found are quail, wild duck, snipe, plover, partridge, ortolans, and green pigeons. Snakes are very numerous. Crocodiles are common in the large rivers, and the rivers and marshes abound in fish.

Population.—Several early estimates were made of the population of Sárán. In 1800, a calculation based on an enumeration of the houses gave 1,104,000 as the number of inhabitants; but this included the present District of Champáran, which was not separated from Sárán until 1837. Estimates based on similar enumerations were made in 1843, 1847, 1854, 1855, and 1860, the earliest giving a population of 1,376,215, and the latest 1,271,729. The first accurate Census was that taken in 1872, which disclosed a total population of 2,063,860. The last enumeration in 1881 returned the population of Saran District at 2,280,382, showing an increase of 216,522, or 10.49 per cent., in the nine years since 1872.

The results arrived at by the Census of 1881 may be summarized as

follows:—Area of District, 2622 square miles, with 7 towns and 4372 villages. Number of houses, 376,787, namely, occupied 326,699, and unoccupied 50,088. Total population, 2,280,382, namely, males 1,083,765, and females 1,196,817, proportion of males, 47·4 per cent. The slight excess of females is due to emigration of males from the more thickly populated tracts, to seek labour elsewhere. As regards density, Sāran is the most thickly populated District within the Lieutenant-Governorship of Bengal (except the suburban District of Howrah), with an average pressure on the soil of 870 persons per square mile; as against 860 per square mile in Muzaffarpur, and 845 per square mile in Patná, both neighbouring Districts. Sāran is one of the most purely agricultural Districts in Bengal, with a very fertile soil; and in tracts like the police circles (*thánás*) of Mashrak, Digwárá, and Mánjhí, with no towns or large trade centres, the density reaches the enormous average of 1240, 1134, and 1047 per square mile respectively. The most sparsely populated *tháná* is Barágáon, with an average of 689 per square mile. The number of villages over the whole District area averages 1·67 per square mile; persons per town or village, 521; houses per square mile, 143·7; inmates per house, 6·9. Classified according to sex and age, the population consists of—under 15 years of age, boys 461,553, and girls 442,538; total children, 904,091, or 40 per cent. of the District population: 15 years and upwards, males 622,012, and females 754,279; total adults, 1,376,291, or 60 per cent.

Religion.—Classified according to religion, the Census Report of 1881 returns the Hindus at 2,010,958, or 88·2 per cent. of the population; Muhammadans, 269,142, or 11·8 per cent.; and Christians, 282. High-caste Hindus are strongly represented, numbering 579,800, or 25·3 per cent. of the total Hindu population, namely, Brahmans, 173,362; Rājputs, 243,972; Bābhans, or *samindárá* Bráhmans, 84,733; Káyasths, 51,067; and Baniyás, 26,666. The Súdra or lower Hindu castes include the following:—Goálá, the herdsman caste, and the most numerous in the District, 256,513; Koerí, 150,354; Kandu, 120,310; Kurmí, 112,570; Chamár, 111,144; Dosádh, 79,593; Nuniyá, 68,720; Telí, 63,087; Lohár, 42,057; Káhár, 35,537; Nápit, 31,844; Kumbhár, 24,594; Kalwár, 23,979; Mallah, 22,599; Sonár, 21,472; Bind, 19,127; Dhanuk, 17,801; Dhobí, 17,103; Barháí, 16,936; Tatwá, 10,826; Baruí, 10,386; Garerí, 9881; Dom, 9506; Máli, 6909; Musahár, 6465; and Pásí, 5562. Caste-rejecting Hindus are returned at 3476, of whom 2320 are Vaishnavs. Aboriginal tribes number 20,953, including 11,428 Gonds (?); but all are returned as professing Hinduism. The Muhammadan population, classified according to sect, consists of—Sunnís, 231,533; Shiás, 4072; and unspecified, 33,537. Of the 282 Christians, 138 are Europeans by race, 10 Eurasians, and 134 Natives of India. By sect, 71 belong to the Church of England, 43 are Roman Catholics, 31 Protestants

without distinction of sect, and 34 are Lutherans; other sects and unstated, 103. A branch of the Lutheran Evangelical Mission has been stationed in Chapra town since 1840. The majority of the native Christians are very poor, nearly all being cultivators, domestic servants, or labourers.

Town and Rural Population.—The Census Report returns 7 towns as containing upwards of five thousand inhabitants, namely, CHAPRA, population (1881) 51,670; SEWAN, 13,319; REVELGANJ, 12,493; Panapur Chagwan, 6425; Ránsipur Tengrahi, 6197; Mánjhi, 6068; and Parsa, 5735. The total urban population thus disclosed is 101,907, or 4·4 per cent. of the District population. Only the three first-named places, however, are towns in any sense of the word, and they constitute the only municipalities within the District. The other places are merely large villages or collections of hamlets, in the midst of which are conducted all the operations of agricultural life. The income of the three municipalities in 1883-84 amounted to £5302, of which £3556 was derived from taxation; average incidence of taxation, 1 rd. per head of the population (76,942) within municipal limits.

Of the 4372 villages, 1209 contain less than two hundred inhabitants; 1696 between two and five hundred; 989 between five hundred and a thousand, 392 between one and two thousand; 65 between two and three thousand; and 21 between three and five thousand inhabitants.

As regards occupation, the Census divides the male population into the following six classes:—(1) Professional and official class, 14,915; (2) domestic servants, inn and lodging-house keepers, etc., 27,432; (3) commercial class, including merchants, traders, carriers, etc., 26,640; (4) agricultural and pastoral class, including gardeners, 479,076; (5) manufacturing and industrial class, including all artisans, 62,040; and (6) indefinite and non-productive class, comprising general labourers and all male children, 473,162.

The Material Condition of the People can hardly be good in a densely crowded agricultural District like Sárán. The District is unusually fertile, and almost every available acre highly cultivated. The larger husbandmen, and classes who hold at privileged rates of rent, are enabled to live in comfort in ordinary good seasons. But, considering the rise of rents in late years, it is doubtful whether the great body of cultivators, in spite of the general rise in prices of grain, are better off than formerly. In many parts of the District, too, the increasing number of indigo factories, and the demand for land on this account, are said to have further unfavourably affected their condition. The wealthier classes live in brick houses; the country shopkeepers and husbandmen in mud huts. The better class of houses in the town of Chapra have a verandah, often ornamented with carvings in wood. The house of an ordinary cultivator consists of three or four rooms,

with an outer and an inner verandah ; and sometimes a covered place in the centre, where the family sit and receive visitors. The huts of the poorest classes are of a very primitive character, and consist merely of walls of common thatching grass, with a thin roof of the same materials, supported by a few bamboos. *Gods* or granaries for keeping rice are common. The estimated living expenses for a household of six members belonging to a well-to-do shopkeeper is estimated at about £1, 7s. per month ; and for a similar family of the ordinary cultivating class, at a little below £1 a month, at the ordinary market prices. The husbandman, however, himself produces nearly all his food requirements ; and he very seldom has to purchase anything beyond cloth and salt in the *bázár*.

Agriculture.—Rice is, perhaps, the most important crop grown in Sárán ; though the area under rice is largely exceeded by the collective area under such inferior grains as *makai*, *kodo*, and *marud*. It consists of two great harvests—the *bhadai* or autumn harvest, and the *aghani* or winter harvest, the latter being by far the larger of the two. The *bhadai* is generally sown broadcast on high ground in June, and reaped in September. Its chief varieties are, (1) *sathi*, (2) *sarha*, (3) *kathi* or *munga*, and (4) *karhani*. *Aghani* rice is sown on low ground. In June, after rain has fallen, a nursery is selected, and ploughed three or four times before the seed is sown. It is afterwards transplanted, and is harvested in December or January. The 33 principal varieties of this rice are as follows :—(1) *Bhoinsloti*, (2) *kanuga*, (3) *khádhá*, (4) *júgar*, (5) *senegra*, (6) *jasarid*, (7) *thanomi*, (8) *sáro*, (9) *será*, (10) *sallá*, (11) *shakhjirá*, (12) *kalunji*, (13) *sátul*, (14) *seld*, (15) *lánji*, (16) *batarani*, (17) *káji*, (18) *ldldána*, (19) *umath*, (20) *rathgoli*, (21) *dachni*, (22) *bellaur*, (23) *baharni*, (24) *bánsmati*, (25) *sámjirá*, (26) *júgar*, (27) *khera*, (28) *rás*, (29) *pahárid*, (30) *singhár*, (31) *syámsundar*, (32) *karanga*, and (33) *gajpatta*.

The other cereals cultivated are wheat, barley, and Indian corn. Green crops comprise *matar* or peas, *khesari*, gram, *arhar*, *mug*, *urid*, beans, sweet potatoes, mustard-seed, etc. Cotton, hemp, and flax are also grown. *Pán* or betel-leaf is generally cultivated on high land situated near a well or tank, in the vicinity of the homestead. Special crops comprise tobacco, sugar-cane, indigo, and opium ; the latter being cultivated only under Government licence. The total area under indigo is (1884) estimated at 48,750 acres, yielding an average out-turn of 10,250 cwts., valued at £315,000. The total area under poppy is about 48,700 acres, with a yield of 733,360 lbs. Manure is used whenever it can be procured, and irrigation is largely practised for the cold-weather crops.

The poorer class of cultivators are, as a rule, deeply in debt. Rents are high, the following being returned as the average rates throughout

the District:—Transplanted rice, 9s. 6½d. per acre; broadcast rice, 6s. 9d.; Indian corn, wheat, *marut*, *arhar*, and cotton, 11s. 3d.; *kodo*, barley, and pulse, 9s. 5½d.; poppy, 15s. 8d.; indigo, 10s. 4½d.; and sugar-cane, 9s. 11d. It is very common to find Bráhmans, Bábhans, Rájputs, and other high castes holding the best lands in a village at rates varying from 50 to 75 per cent. below what a low-caste man pays for inferior land. Rents are now almost invariably paid in money, instead of in kind, as was formerly common. As a general rule, the cultivators claim to hold under a right of occupancy, but such tenures are rarely transferable, except with permission of the landlord. Tenants holding their lands without liability to enhancement do not number more than 5 per cent. of the whole. Wages have increased about 30 per cent. of late years. The rates for ordinary day-labourers vary from 3d. to 4½d. per day, according as they are employed in the country or the town, women and boys receive from 2d. to 3d. per day. Bricklayers and blacksmiths get from 6d. to 7½d. a day; sawyers, 6d.; and carpenters, from 4½d. to 7½d. a day. Prices of food-grains have risen in like proportion. In 1882–83, which may be taken as an ordinary year, 40 lbs. of common rice could be obtained for the rupee; while in 1883–84, a year of deficient rainfall, the price rose to 31½ lbs. for the rupee. In 1877–78, when scarcity prevailed owing to an ill-distributed rainfall and excessive exportation to Southern India, only 27 lbs. of rice were to be got for the same money. Old records show that in 1790 the price was 150 lbs. for the rupee.

Natural Calamities.—The District is subject to blight, flood, and drought. The most common kind of blight is called *hundá*, a mildew which attacks wheat and barley. Insects do considerable damage; and also hailstorms in the cold weather. Sárán District, being bounded on two sides by large rivers, which flow on ridges and carry enormous volumes of water, is peculiarly exposed to inundation. The northern side of the District is now, however, completely protected by the Gandak embankment. Towards the south, along the banks of the Ganges and Gogra, protective works are still required, as large tracts are inundated nearly every year. The old records are full of complaints about these inundations, which in many cases rendered a remission of revenue necessary. The most noteworthy floods of late years occurred in 1871 and 1874. Droughts have occurred several times, the worst known having taken place in 1866 and 1874, both of which were caused by the failure of the local rainfall. During the scarcity of 1874, relief works on an extensive scale were undertaken by Government, and in the first fortnight of June a daily average of 229,885 persons were employed in road-making. Advances of grain were made to the extent of 324,831 *maunds*. Prices were kept down, however, by Government importations, and the highest rate reached for common

rice in 1874 was 12s. 1½d. per cwt., as against £1, 1s. 10d. per cwt. in 1866. To remedy this liability to drought, a scheme of irrigation was commenced in 1878, by which the waters of the Gandak are now led through the centre of the District. The total cost amounted to £70,000, on which sum a few planters and *saminddrs* have guaranteed interest at the rate of 4 per cent. The total irrigated area is estimated at 163,800 acres.

Means of Communication, Trade, etc.—The District possesses a total length of 926 miles of made road; and the Bengal North-Western Railway (opened in 1884) runs east and west through the District, with stations at Sonpur, Chaprá, Sewán, and Mairwa. The principal manufactures are indigo, sugar, brass-work, pottery, saltpetre, and cloth. The chief exports from Sárán are oil-seeds, indigo, saltpetre, sugar, and grain of all sorts, except rice; the principal articles of import are rice, salt, and European piece-goods. The great trading mart of the District is Revelganj. In 1876–77, the total registered river traffic of Sárán District, including both imports and exports, amounted to just two millions sterling. A great portion of this total is merely through traffic, which comes down from Oudh and the North-Western Provinces, and changes boat at Revelganj and Semuria, on its way to Patná or Calcutta. Revelganj is perhaps the largest mart for oil-seeds (chiefly linseed) in all India. In 1876–77, the total registered import of oil-seeds into the District was valued at £265,000; the total export was £370,000, thus leaving a balance of more than £100,000 for the local produce. As regards food-grains, however, the figures show decisively that Sárán is unable to supply its own dense population. In 1876–77, the imports of food-grains of all kinds were valued at £326,000, as compared with exports valued at only £118,000. The other principal items of export were indigo (£179,000), and saltpetre and other saline substances (£67,000). Salt was imported to the value of £143,000. Owing to an alteration in the system of collecting trade statistics, later figures than those for 1876–77 are not available.

Administration.—In 1794, the net revenue of the District (which then included Champáran) amounted to £195,254, with a civil expenditure of £27,496; in 1850–51, the revenue (still including Champáran) was £230,567, with an expenditure of £24,131; in 1870–71 (after the separation of Champáran), the net revenue of Sárán alone was £185,072, with an expenditure of £43,826. In 1883–84, the six main items of Government revenue aggregated £203,734, made up as follows:—Land revenue, £122,612; excise, £34,362; stamps, £26,086; registration, £2492; road cess, £14,625; municipal taxes, £3557. Cost of officials and police of all kinds, £24,532. The total number of estates in Sárán District in 1883–84 was 4207, with 45,593 registered proprietors or coparceners; average

payment from each estate, £27, 2s. 10d., or from each individual proprietor, £2, 13s. 9d.

For administrative, police, and fiscal purposes, Sâran District is divided into three Sub-divisions and ten police circles (*thânds*), as follows:—(1) Head-quarters Sub-division, with the five *thânds* of Chaprá, Mánjhí, Parsa, Mashrak, and Dighwara; (2) Gopâlganj Sub-division, with the two *thânds* of Gopâlganj and Barágâon; and (3) Sewán Sub-division, with the three *thânds* of Sewán, Darauli, and Basantpur. Seven judges and 9 stipendiary magistrates. The regular and town police force in 1883 consisted of 539 officers and men, maintained at a cost of £9443, being an average of 1 policeman to every 48 square miles and to every 4230 of the population. Besides, the village watch or rural police numbered 5327 men, maintained, either by the *zamindárs* or by service lands held rent-free, at an estimated total cost of £10,326 a year. Each village watchman has charge of 66 houses on an average, and receives an average pay in money or lands of £1, 18s. a year. There are 2 jails in the District, at Chaprá and Sewán towns, with a daily average prison population in 1883 of 262, the total admissions being 2134. The principal criminal classes are the Dosádhs, Goálás or Ahírs, and Maghya Doms.

Education has rapidly progressed since the introduction of Sir George Campbell's educational reforms in 1872. In 1870-71 there were only 9 Government or aided schools in the District, attended by 585 pupils. At the close of the year 1873-74 the inspected schools numbered 326, with 7066 pupils. In 1883-84 there were upwards of 1525 inspected schools, attended by about 18,000 pupils. The *zili* school at Chaprá town had 388 pupils on the 31st March 1884. The Census Report of 1881 returned 19,452 boys and 631 girls as under instruction, besides 31,732 males and 1024 females able to read and write, but not under instruction.

Medical Aspects.—The seasons in Sâran are very similar to those of Tírhút, but perhaps a little hotter. The hot weather begins about the end of March; and in a fortnight afterwards, hot westerly winds begin to blow during the day. At night, the wind comes generally from the east, and the temperature is comparatively cool, being lowered by occasional thunderstorms. The rains set in about the middle of June, and continue, with intermissions, till about the end of September or the middle of October. September is by far the most trying month of the year; the air is damp and steamy, while the sun's rays are extremely strong. The cold weather begins about the middle of October, and continues till the beginning of March. Average annual rainfall at Chaprá town, 39·43 inches. No thermometrical returns are available. The prevailing diseases are cholera, small-pox, fever, and dysentery. The civil surgeon states that it is doubtful if cholera

is ever really absent from the District; and it commits great ravages towards the end of the hot and beginning of the rainy season. Small-pox comes next in intensity, but the people are beginning to avail themselves of vaccination. Both these diseases are said to be now on the decrease, owing to the improved habits of the people and the high state of cultivation. The people who live in the neighbourhood of low rice lands suffer a good deal from fever. Dysentery, the result of bad water and insufficient clothing, is sometimes very severe. Six Government charitable dispensaries afforded medical relief in 1883 at Chaprá, Sewán, Hatwá, Bhoi, Gopálganj, and Revelganj to 60,243 patients. Cattle disease exists in the form of *guli* or rinderpest, and *kurhd* or foot-and-mouth disease. [For further information regarding Sárán, see *The Statistical Account of Bengal*, by W. W. Hunter, vol. xi. pp. 225-371 (London, Trubner & Co., 1877); the *Bengal Census Report* for 1881; and the several Administration and Departmental Reports of the Bengal Government.]

Sárán.—Head-quarters Sub-division of Sárán District, Bengal.
—See CHAPRA.

Sáranda.—Hill range in the extreme south-west corner of Singhbhúm District, bordering on Gangpur State, Bengal. Consists of a grand mass of mountains, rising to the height of 2738 feet, known as 'Sáranda of the seven hundred hills.' The population inhabiting this region is scattered over a few poor hamlets nestling in deep valleys, and belongs for the most part to one of the least reclaimed tribes of Kols.

Sáranda.—One of the *pírs* or groups of villages of the Kolhán, in Singhbhúm District, Bengal. According to the Census of 1881, the *pír* contains 88 villages, assessed at a Government revenue of £58. Lat. $22^{\circ} 1' 15''$ to $22^{\circ} 30' N.$, long. $85^{\circ} 2'$ to $85^{\circ} 28' E.$

Sarangarh.—Native State attached to Sambalpur District, Central Provinces, formerly one of the *Athára Garhjáts* or 'Eighteen Forts,' lying between $21^{\circ} 21'$ and $21^{\circ} 45'$ N. lat., and between $82^{\circ} 59'$ and $83^{\circ} 31'$ E. long. Bounded on the north by the Chandrapur chiefship and Ráigarh State, on the east by Sambalpur District, on the south by the Phuljhar chiefship, and on the west by Biláspur District. Population (1881) 71,274 (of whom 63,231 were Hindus), residing in 442 villages and 25,406 houses. Area, 540 square miles, of which 320 were cultivated in 1877, while of the portion lying waste 80 square miles were returned as cultivable. Density of population, 132 persons per square mile.

The country is generally level, but in the south and east rise two considerable ranges of hills. The Mahánadi flows through the north of the State and affords water communication for a length of 50 miles; the only other river worth mention is the Lát. Though no large

forests remain, patches of *sáj*, *dhurá*, *tendu*, etc. are met with here and there. Bison, formerly numerous, have now abandoned the State; but tigers, bears, and leopards still range the hills and jungle. The soil is for the most part light and friable, with a strong admixture of sand. Rice forms the staple crop; but pulses, oil-seeds, sugar-cane, cotton, and a little wheat are also produced. The only manufactures are *tasar*-silk and coarse cotton cloth; and though iron-ore abounds, no mines are worked.

The chief is a Gond, and traces his origin through 54 generations up to Jagdeva Sá, a son of Narendra Sá, Rájá of Lánjí in Bhandará about 91 A.D. In return for military assistance, Narsingh Deva, Rájá of Ratanpur, presented Jagdeva Sá with a *khilat* or personal mark of distinction, and conferred on him the title of *díwán*, together with 84 villages in the Sárangarh tract. Forty-two generations later, when Kalyán Sá was *díwán*, Raghuji Bhonsla of Nágpur was stopped on his way to Cuttack by the Phuljhar people, who held the Singhora Pass against him. Raghuji applied to Banoji, Rájá of Ratanpur, who directed Kalyán Sá to clear the pass. For this service, Kalyán Sá received the title of Rájá, with the right to carry a standard. The title was confirmed by Rájá Chhatra Sá of Sambalpur, when Sárangarh became a dependency of his kingdom; and by their military assistance from time to time to the Sambalpur princes, succeeding Rájás of Sárangarh gained further grants of villages and *parganá*s, and gradually made Sárangarh a State of some importance. The only remarkable building in the State is the temple of Samleswar Deva, erected in 1748 by Aditya Sá Díwán. Sangram Singh, the late Rájá, established a good school at his chief town, and there are also indigenous schools in other parts. During the minority of the present Rájá, Bhawáni Pratáp Singh, the State has been under British management. The young chief, who was educated at the Rájkumar College at Jabalpur, attained his majority in 1885. The tribute is £135; revenue (1883-84), £3850. The climate is unhealthy, and fever prevails widely from September to November.

Sárangarh.—Chief town of Sárangarh State, Central Provinces, and residence of the Rájá. Population (1881) 4220, namely, Hindus, 3638; Kabíranthis, 35; Muhammadans, 230; and non-Hindu aborigines, 317.

Sarangpur.—Town in Dewás State, Central India Agency; situated on the right bank of the Káli Sind river, on the trunk road between Gúna and Indore, 92 miles from the former, and 80 miles from the latter. Population (1881) 13,543, namely, males 6610, and females 6933. Hindus number 8776; Muhammadans, 4737; and 'others,' 30.

Saraspur (*Sarishpur* or *Siddheswar*).—Hill range in the south of

Assam, forming the boundary between Cachar District on the east and Sylhet on the west. The height varies from 600 feet to 2000 feet above sea-level. At Badarpur, at the northern extremity of the range, is an ancient temple dedicated to Siva, who is worshipped under the name of Siddheswar (Lord of the Pure). An annual fair takes place here, which is numerously attended.

Saraswatí (Sarsutí).—Sacred river of the Punjab, famous in the early Bráhmical annals. Rises in lat. $30^{\circ} 23' N.$, long. $77^{\circ} 19' E.$, just beyond the British border, in the low hills of Sirmur (Sarmor) State; emerges upon the plain at Zadh Budri in Ambála (Umballa), a place esteemed sacred by all Hindus; flows in a general south-westerly direction, and loses itself more than once in the sands, but reappears again with little diminished volume; passes by the holy town of Thanesar and the numerous shrines of the Kurukshetra, a tract celebrated as a centre of pilgrimages, and as the scene of the battle-fields of the *Mahábhárata*; enters Karnál District and Patiala State, where it finally joins the Ghaggar (lat. $29^{\circ} 51' N.$, long. $76^{\circ} 5' E.$).

In ancient times, the united stream below the point of junction appears to have borne the name of Sarsutí, and, undiminished by irrigation near the hills, to have flowed across the Rájputána plains, debouching into the Indus below its confluence with the Punjab rivers. The deserted bed can still be traced as far as Mirgarh in Baháwalpur; but the water now penetrates no farther than Bhatner in Rájputána, where its trickling streams finally disappear by evaporation. The numerous dams across the hill torrents at the foot of the mountains probably account for the drying up of the ancient channel.

The name of Saraswatí, 'the river of pools,' sufficiently describes the character of the stream in its upper portion, where it dries up partially in the early months of the year, becoming a mere succession of separate ponds. To each of these is attached a legend and a shrine, visited by thousands of pilgrims every year. According to Hindu legend, the disappearance of the Saraswatí in the sands is accounted for as follows:—Saraswatí was the daughter of Mahádeo; but her father one day, in a drunken fit, approaching her with the intention of violating her modesty, the Hindu Arethusa fled, and dived underground whenever she saw her pursuer gaining upon her; and the river, which sprang up in her track, still disappears underground at the self-same spots. By devout Hindus the Saraswatí is supposed to flow in a subterranean course till it joins the Ganges and the Jumna (Jamuná) at ALLAHABAD, where the moisture on the walls of the crypt in the temple of the Undying Banian tree forms a conclusive proof of its existence in the eyes of the faithful. The real direction of the Saraswatí basin, however, lies towards the Indus below Mithánot. Some of the earliest Aryan settlements in India were on the banks of the Saraswatí, and the

surrounding country has from almost Vedic times been held in high veneration. The Hindus identify the river with Saraswatī, the Sanskrit Goddess of Speech and Learning. [See Muir's *Orig. Sanskrit Texts*, vol. i., many passages (ed. 1868); General Cunningham's *Anc. Geog. Ind.* pp. 331-33 (ed. 1871); Prof. Dowson's *Dict. Hindu Mythol.* p. 284 (ed. 1879); and article INDIA, *ante*, Vol. vi.]

Saraswatī.—Silted up channel in Húglī District, Bengal. Formerly the main stream of the Ganges, and navigable by large vessels as far as SÁTGAON, the royal port of Bengal, from the earliest historical times up to the 16th century. At one time, this was a broad river flowing between high banks, at places 600 feet apart. It carried the main body of what is now the Húglī, and enjoyed religious honours as the true continuation of the Ganges. According to Sanskrit legend, the sanctifying waters of the Saraswatī enter the Jumna at Allahábád, and leave the Ganges at Tribení Ghát, 36 miles above Calcutta, in lat. 22° 59' N., and long. 88° 26' 45" E. By the beginning of the 16th century, the Saraswatī mouth had so far silted up, that the Portuguese abandoned SÁtgaon, and established a new port of their own a few miles lower down the Húglī at Gholghát, which grew up into Húglī town. At the present day, the Saraswatī at Tribení is a mere tidal ditch. The site of SÁtgaon is left high and dry, but remains of old ships have been frequently discovered buried many feet in the ground. The course of the dead river can still be traced to the south-west of Tribení by a series of pools and marshes, until after throwing off a branch into the Damodár near Amptá, the main stream regains its character of a navigable channel near Sánkrel in Howrah District, where it re-enters the Húglī a short distance below the Calcutta Botanical Gardens.

Saraswatī.—River of Western India, rising in Mount Abu, Rájputána. Flowing through the Pálanpur and Rádhanpur States of the Mahi Kántha Agency, and through the Patan Sub-division of Baroda State, the Saraswatī, after a south-westerly course of over 100 miles, enters the Rann of Cutch to the east of the State of that name. In the vicinity of Sidhpur and Patan towns, by which the river passes, the Saraswatī is said to have a subterranean course of several miles, reappearing before it enters the Rádhanpur territory. The river is fordable almost everywhere; its banks and bed are generally sandy; it is nowhere navigable. The only importance of the Saraswatī consists in its sanctity. It is visited by Hindus, especially those who have lost their mothers; Sidhpur on this river being considered the appropriate place to perform rites in honour of a deceased mother, as Gayá in Behar is assigned for ceremonies in honour of a deceased father.

Sárathá.—Port on the Sárathá river, in Balasor District, Orissa. Lat. 21° 34' 45" N., long. 87° 8' 16" E. Frequented by native rice

sloops, the river being navigable as far as Nalitagarh, 8 miles from the sea. The sister port of Sárathá is CHHANUYA.

Sarath Deogarh.—Sub-division and town in the Santál Parganás, Bengal.—See DEOGARH.

Saranli.—Village in Khakreru *tahsil*, Fatehpur District, North-Western Provinces; situated in lat. $25^{\circ} 40' 21''$ N., long. $81^{\circ} 0' 19''$ E., $4\frac{1}{2}$ miles from Khakreru town, and 22 miles from Fatehpur. Population (1881) 3228; prevailing caste, Lodhás.

Saráyan.—River of Oudh. Rising in Kheri District in lat. $27^{\circ} 46'$ N., and long. $80^{\circ} 32'$ E., after a course of 49 miles in a south-easterly direction it enters Sitápur District, where it receives the Jamwári on its left bank, in lat. $27^{\circ} 32'$ N., and long. $80^{\circ} 47'$ E. Thence it flows for about 3 miles in a north-westerly course, and, resuming its previous direction, joins the Gumti in lat. $27^{\circ} 9'$ N., and long. $80^{\circ} 55'$ E. Total length, about 95 miles. It causes destructive floods in some years, as it drains a considerable area of country with its numerous affluents.

Sárda.—River of North-Western India and Oudh. Rising in the loftier ranges of the Himálayas, which separate Kumáun from Tibet, at an altitude of 18,000 feet, it debouches from the hills at Barmdeo, 148 miles from its source, in lat. $29^{\circ} 6'$ N., and long. $80^{\circ} 13'$ E., at an altitude of 847 feet above sea-level. The river is here 450 feet broad, with a minimum discharge of 5600 cubic feet per second. Shortly after leaving Barmdeo, it divides into several channels, which reunite 9 miles farther down at Banbása, but again separate, and finally join at Mundrá Ghát, 168 miles from its source, where the last rapids occur, and the stream becomes an ordinary river of the plains. Eleven miles lower down, it touches British territory in Khairigarh *parganá*, Oudh; and 11 miles farther on, or 190 miles from its source, it joins the CHAUKA near Mothia Ghát. From this point the united stream takes the name of the Chauká, till it falls into the GOGRA on its right bank, in lat. $27^{\circ} 9'$ N., and long. $81^{\circ} 30'$ E.

Sardár Shahr (*Sirdár Shir*).—Town in Bikaner (Bickaneer) State, Rájputána; situated about 75 miles north-east of Bikaner town. Population (1881) 5841. Hindus number 2748; Muhammadans, 851; and 'others,' 2242.

Sardhána.—*Tahsil* of Meerut (Merath) District, North-Western Provinces, lying on either side of the Hindan river, and watered by the Ganges and Eastern Jumna Canals; comprising the *parganá*s of Sardhána and Barnáwar. Area, 251 square miles, of which 184 square miles were cultivated. Population (1881) 159,422, namely, males 85,855, and females 73,567. Hindus number 117,803; Muhammadans, 33,770; Jains, 7267; and Christians, 582. Number of towns and villages, 123, of which 40 contain less than five hundred inhabitants; 29 from five hundred to a thousand; 51 from one to five thousand;

and 3 upwards of five thousand inhabitants. Land revenue, £30,043; total Government revenue, £33,051; rental paid by cultivators, £55,455. In 1883 the *tahsil* contained 1 criminal court, with 3 police circles (*thānds*); strength of regular police, 36 men; rural police or village watch (*chaukidārs*), 276.

Sardhāna.—Town in Meerut (Merath) District, North-Western Provinces, and former capital of the notorious Begam Samru; situated in lat. 29° 9' 6" N., and long. 77° 39' 26" E., on a low site near the Ganges Canal, 12 miles north-west of Meerut city. A station on the Sind, Punjab, and Delhi Railway. Population (1881) 13,313, namely, males 6858, and females 6455. Hindus number 5898; Muhammadans, 5764; Jains, 1070; and Christians, 581.

The town has a poor and decayed appearance, being in a decadent condition since the death of the Begam Samru. Northward lies Lashkarganj, founded by the Begam as a camp, and the old fort; next succeeds a wide parade-ground; and southward stands the town itself. Local tradition assigns the foundation of Sardhāna to one Rājā Sarkat at a period anterior to the Muhammadan conquest. Its modern history is interesting from its connection with the two European adventurers Walter Reinhardt and George Thomas.

The following sketch is condensed from an account given in the official Gazetteer of Meerut. Walter Reinhardt, better known by the name of Samru or Sombre, was a butcher by profession, and a native of Luxemburg. He came to India as a soldier in the French army, and deserting that service, took employment with the British, where he attained to the rank of sergeant. Deserting again, he rejoined the French service at Chandarnagar, and on the surrender of that settlement accompanied M. Law in his wanderings throughout India from 1757 to 1760. In the latter year, Law's party joined the army of Shāh Alam in Bengal, and remained with the emperor until his defeat in 1760 at Gayā by Colonel Carnac, in his attempt to reconquer Bengal from the Nawāb. Samru next entered the service of Mir Kāsim, by whom he was employed to murder the English prisoners at Patna (PATNA DISTRICT, *q.v.*) in October 1763. He succeeded in escaping into Oudh, and afterwards entered the service of several native chiefs, until in 1777 he entered the service of Mirza Najf-Khān, the general and minister of Shāh Alam II., and received the *parṣad* of Sardhāna in fief, as an assignment for the support of his battalions. He died here in the following year, and was succeeded by his widow, the Begam Samru, who continued to maintain the military force. This remarkable woman, the illegitimate daughter of a Musalmān of Arab descent, and the mistress of Reinhardt before becoming his wife, assumed the entire management of the estate, and the personal command of the troops, which numbered 5 battalions of

sepoys, about 300 European officers and gunners, with 50 pieces of cannon, and a body of irregular horse.

In 1781 the Begam was baptized into the Roman Catholic Church, under the name of Johanna. Her troops rendered excellent service to the Delhi Emperor in the battle of Gokalgarh in 1788, where a charge of Sardhána troops, personally led by the Begam and the celebrated adventurer George Thomas, saved the fortunes of the day at a critical moment. In 1792, the Begam married Levassoult, a Frenchman in command of artillery. In 1795, her European officers became disaffected, and an illegitimate son of Reinhardt, known as Zafaryáb Khán, put himself at their head. The Begam and her husband were forced to fly. In the flight the Begam's palanquin was overtaken by the rebels, and she stabbed herself to prevent falling alive into their hands; whereupon Levassoult shot himself, in pursuance of a vow that if one of them was killed the other would commit suicide. The Begam's wound, however, was but a slight one, and she was brought back to Sardhána. Another account is that the Begam had become tired of her husband, and that her self-inflicted wound was only a device to get rid of him. However, all her power passed temporarily into the hands of Zafaryáb Khán, and she was treated with great personal indignity, till she was restored to power some months later by her old general George Thomas. Henceforth the Begam remained in undisturbed possession of her estates till her death in 1836.

After the battle of Delhi, and the British conquest of the Upper Doáb in 1803, the Begam submitted to the new rulers, and ever after remained distinguished for her loyalty. Her possessions were numerous, and included several considerable towns, such as Sardhána, Baraut, Barnáwa, and Dankaur, lying in the immediate neighbourhood of great marts like Meerut, Delhi, Khúrja, and Bágpát. Her income from her estates in Meerut District alone amounted to £56,721 per annum. She kept up a considerable army, and had places of residence at Khirwa, Jalálpur, Meerut, and Delhi, besides her palace at Sardhána. She endowed with large sums the Catholic churches of Madras, Calcutta, Agra, and Bombay, the Sardhána Cathedral, the Sardhána poorhouse, St. John's Roman Catholic College, and the Meerut Catholic Chapel. She also made over a *lakh* of Sonat rupees to the Bishop of Calcutta for charitable purposes, and subscribed liberally to Hindu and Musalmán institutions.

Zafaryab Khan, the son of Samru, died in 1802, and left one daughter, whom the Begam married to Mr Dyce, an officer in her service. David Ouchterlony Dyce Sombre, the issue of this marriage, died in Paris, July 1851, and the Sardhana estates passed to his widow, the Hon. Mary Anne Forester, daughter of Viscount St. Vincent.

The Begam's residence, on the east of the town, is a fine modern

house, with a grand flight of steps at the entrance and extensive grounds. It is well furnished, and contains some good pictures. The Roman Catholic Cathedral, built in 1822, stands south of the town, and is an imposing building, surrounded by an ornamental wall. St. John's College, for training priests, occupies a low masonry house, once the Begam's private residence. Four Jain temples. Schools. *Tahsili*, police station, post-office. Old fort at Lashkarganj in ruins. Sardhána is now essentially an agricultural town, with little trade and no manufactures.

Two excellent papers on the Sardhána estate, and a biography of George Thomas, in the *Calcutta Review* for January and April 1880, by Mr. H. G. Kecne, B.C.S., differ in some unimportant points from the history of the estate as given above.

Sareni.—*Parganá* in Dálmau *tahsil*, Rái Bareli District, Oudh; bounded on the north by Khiron, on the east by Dálmau, on the south by the Ganges, and on the west by Daundia Khera. Area, 114 square miles, or 72,968 acres, of which 41,679 acres are cultivated. Population (1881) 63,823, namely, Hindus 61,236, and Muhammadans 2587. Of the 169 villages in the *parganá*, 143 are held under *tálukdári* tenure, Bais Rájputs being the chief proprietary body; 23 villages are *zamindári*; and 3 are *pattidári*. Government land revenue, £8924.

Sargúja.—The largest of the Native States of Chutiá Nágpur, Bengal; lies between 22° 37' 30" and 24° 6' 30" N. lat., and between 82° 32' 5" and 84° 7' E. long. Area, 6055 square miles. Population (1881) 270,311 souls. Bounded on the north by Mírzápúr, a District of the North-Western Provinces, and the State of Rewá; on the east by Lohárdagá District; on the south by Jashpur and Udaipur States, and the District of Biláspur in the Central Provinces; and on the west by Koréá State.

Physical Aspects.—Sargúja may be described in general terms as a secluded basin, walled in on the north-east and south by massive hill-barriers, and protected from approach on the west by the forest-clad tract of Koréá. The eastern portion of the State consists of an undulating table-land about 2500 feet above the sea, continuous with, but slightly higher than, the adjoining plateau of Chutiá Nágpur proper. From this, again, isolated hill ranges, and *páts* or plateaux, capped with a horizontal stratum of trap rock, rise to an elevation of 3500 and 4000 feet, forming on the north the boundary of Palámau, and blending in the south with the northern Jashpur Hills. The two most prominent physical features of Sargúja are the Máinpát, a magnificent table-land 18 miles long, from 6 to 8 miles broad, and 3781 feet above sea-level; and the Jamirápát, a long winding ridge about 2 miles wide. The Máinpát is well wooded and watered throughout, and supplies extensive grazing fields during the summer months; the pasturage dues

of this tract alone are estimated at £250 per annum. The chief peaks in the State are Maillán, 4024 feet; Jám, 3827; and Partagharsa, 3804. The principal rivers are the Kanhar, Rehr, and Máhán, which flow northwards into the Son (Soane); and the Sankh, a tributary of the Bráhmañ. None of these streams is navigable. Coal is found in Central Sargúja, in the BISRAMPUR field. There is a group of hot springs at Tatápani, in the north of the State; their maximum temperature is 184° F. *Sál* timber abounds everywhere.

History.—The early history of Sargúja is extremely obscure. Authentic records date from 1758, when a Maráthá army in progress to the Ganges overran the State, and compelled its chief to acknowledge himself a tributary of the Berar Government. In consequence of the chief having aided a rebellion in Palámau against the British at the end of the last century, an expedition entered Sargúja under the command of Colonel Jones. Order was restored, and a treaty was concluded between the British Government and the Mahárájá of Chutiá Nágpur, which, however, proved inoperative. As soon as the British force retired, fresh disputes broke out between the ruling chief and his relations; and in 1813, Major Roughtledge, the Political Agent, went to Sargúja and endeavoured to settle the affairs of the State. The young Rájá being imbecile, a *díwán* was appointed to carry on the government; but this officer was soon afterwards killed, and an attempt to seize the Rájá and his two Ránis was only frustrated by the gallantry of a small guard of British Sepoys who had been left in Sargúja for their protection. Until 1818, the State continued to be the scene of constant lawlessness, but in that year it was ceded to the British Government under a provisional agreement concluded with Madhují Bhonsla (Apá Sáhib), and order was soon restored. In 1826 the chief received the title of Mahárájá. The present chief, Mahárájá Raghunáth Saran Singh, attained his majority in July 1882, the State having previously been under the direct management of the Commissioner of Chutiá Nágpur.

Population in 1881 numbered 270,311, on an area of 6055 square miles, inhabiting 1286 villages and 51,122 houses. Males numbered 137,389, and females 132,922. Average density of population, 44·64 persons per square mile; villages per square mile, 0·21; persons per village, 210; houses per square mile, 8·44; persons per house, 5·29. Classified according to religion, Hindus numbered 268,027, and Muhammadans 2284. The bulk of the population are of aboriginal descent, but the Census of 1881 does not give any ethnical classification. In 1872, however, the Dravidian aborigines, consisting principally of Gonds and Uráons, were returned as forming 40·1 per cent., and the Kolarian tribes 21·5 per cent., of the total population. The residence of the Mahárájá is at Bisrámpur; but Pratáppur is

virtually the capital of the State. It contains a court-house, jail, and school. Only two villages in Sargūja have a population of from 1000 to 2000 souls. The chief objects of interest are RAMGARH HILL, the remains of several temples, the deserted fortress of Jūbā, and numerous images. [For a full account of these antiquities and of the aboriginal tribes of Sargūja, see *Statistical Account of Bengal*, vol. xvii. pp. 231-240.]

Agriculture, &c.—The staple crops are cereals, oil-seeds, and cotton. On an average, rents vary from rs. 1½d. to rs. 6d. per acre. Cesses, however, are levied, which equal, and sometimes exceed, the actual rent; and every cultivator is bound to work for his landlord fifteen days in the year, exclusive of the time spent in going to his work. This system of forced labour is at present the chief drawback to cultivation in Sargūja. The passes into the State are impracticable for wheeled traffic. The manufactures are pottery, coarse cloth, and rough ironwork. Weekly markets are held at Pratāppur, Bīsrampur, and Jhilmīlī. Exports—food grains, oil-seeds, *għī*, lac, resin, and cocoons of *tasar* silk; imports—brass and pewter vessels, ornaments, piece-goods, and salt.

Administration.—The finances of the State have much improved while under direct administration; and in 1881, the year before the Mahārājā attained his majority, the revenue amounted to £4094, and the expenditure (including a tribute of £264) to £2109. Police duties are performed by the feudal sub-proprietors, styled *ndkadārs*, each being responsible for the public peace within his borders. Sargūja is divided into 11 police circles, three of which are kept up by the State.

Sargūr.—Town in Mysore District, Mysore State.—*See* SARAGUR.

Sarh Sālimpur (or *Narwal*).—Easternmost *tahsil* of Cawnpur District, North-Western Provinces; consisting of a fertile plain, lying along the south bank of the Ganges, and traversed by the East Indian Railway. Area, 214 square miles, of which 123 square miles are cultivated. Population (1881) 101,830, namely, Hindus 97,547, and Muhammadans 4283. Number of towns and villages, 176, of which 110 contain less than five hundred inhabitants; 34 between five hundred and a thousand; 31 between one and five thousand; and 1 upwards of five thousand inhabitants. Land revenue (1881-82), £22,955; total Government revenue, £26,196; rental paid by cultivators, £39,448. In 1885, the *tahsil* contained 1 criminal court, with 4 police circles (*thānds*); strength of regular police, 37 men; rural police or village watch (*chaukidārs*), 367.

Sarila.—Petty State of Bundelkhand under the political superintendence of the Bundelkhand Agency and the Central India Agency. It lies within *parṣad* Jālālpur of Hamīrpur District, and is surrounded

on all sides by British territory. Area, 35 square miles. Population (1881) 5014, namely, Hindus 4655, and Muhammadans 359. Estimated revenue, £3000. On the division of his estates by Pahár Singh, son of Jagatráj, Rájá of Jaitpur, Mán Singh, his second son, obtained Sarila. His successor, Tej Singh, was expelled by Alí Bahádur, but eventually recovered a portion of his territories through the assistance of Himmat Bahádur. At the time of the British occupation of Bundelkhand, he was found in possession of the fort and village of Sarila. In consideration of his voluntary submission and influence in the District, he was granted 11 villages by *sanad* in 1807. The military force of the State consists of 4 guns, 40 cavalry, and 200 infantry and police.

Sarishpur (or *Siddheswar*).—Hill range in the south of Assam, forming the boundary between Cachar District on the east and Sylhet on the west.—*See* SARASPUR.

Sarjápúr.—Municipal village in Bangalore District, Mysore State. Lat. $12^{\circ} 52' N.$, long. $77^{\circ} 49' 5'' E.$ Population (1871) 2629. Municipal revenue (1881-82), £53. Considerable manufacture of cotton cloth, carpets, and tape. Muslins of fine quality are no longer made. A place of note in the time of Haidar's dynasty; but most of the Muhammadans are now in decayed circumstances. Weekly fair on Fridays.

Sarju.—River in the North-Western Provinces.—*See* GOGRA.

Sarkandi.—Village in Gházipur *tahsil*, Fatehpur District; situated in lat. $25^{\circ} 44' 32'' N.$, and long. $80^{\circ} 57' 4'' E.$, on the banks of the Jumna, 6 miles from Gházipur town. Population (1881) 2409; prevailing caste Bráhmans.

Sarkar Agrahára Vellalúr.—Town in Coimbatore *táluk*, Coimbatore District, Madras Presidency. Population (1881) 5259, namely, Hindus, 5243; Muhammadans, 7; and Christians, 9. Number of houses, 1247.

Sarmastipur.—Trading village in Darbhanga District, Bengal.—*See* SOMASTIPUR.

Sarmor (or *Náhan*).—One of the Punjab Hill States.—*See* SIRMUR.

Sárnáth (probably a corruption of Sárangganáth, 'Lord of Deer,' referring to a legend of Buddha).—Buddhist ruins in Benares District, North-Western Provinces, distant $3\frac{1}{2}$ miles north of BENARES city; Sakya Muni first preached his doctrines here, and some of the ruins probably date from his time (543 B.C.). The remains form a mound of brick and stone *debris* about half a mile long by a quarter of a mile broad, out of which still emerge the remains of two great *stupas*, and a third is in the vicinity. The most remarkable, specially known as the Dhamek, is a solid dome 93 feet in diameter, and 110 feet above the

plain. The plinth, 43 feet high, is of solid stone cramped with iron, and richly sculptured on the exterior. The upper part consists of dilapidated brickwork. The second *stupa* was excavated for bricks in 1794. The third, now called Chaukandi, is 800 yards south of Dhamek, and consists of a lofty ruined mound of brickwork, 74 feet in height, crowned by an octagonal building, commemorating the Emperor Humáyún's visit in 1531. The remains of many other buildings have been excavated in the vicinity. The Dhamek tower probably stands on the site of, if it be not identical with, that erected by Asoka to mark the spot where Buddha first preached his doctrine. The name is a corrupt form of Dharma, 'The Law.' Both Dhamek and Chaukandi *stupas* appear to be mentioned by Hiuen Tsiang. See General Cunningham's *Anc. Geog. Ind.* pp 437, 438 (ed. 1871).

Saromannagar.—*Parganá* in Hardoi District, Oudh. Bounded on the north by Sháhábád; on the east by Báwan; on the south-east and south by the Sukheta river, separating it from Barwán; and on the west by the Garra river, separating it from Páli *parganá*. Area, 35 square miles, of which 21 are cultivated. Population (1881) 13,096, namely, males 7249, and females 5847. Government land revenue, £2172, equal to an average of 3s. 1½d. per acre of cultivated area, or 1s. 11d. per acre of total area. Of the 42 villages in the *parganá*, 20 are held by Sombansís, and 15 by Chamár Gaur. Thirty villages are held in imperfect *pattidári* and 12 in *zamindári* tenure. The country was originally occupied by Thatheras, who were driven out of many of their villages by Gaur Rájputs in the middle of the 12th century; and their total expulsion by the Sombansís occurred shortly afterwards. The *parganá* was first constituted in 1803 by Rájá Bhawání Parshád of Muhamdi, out of villages previously belonging to the neighbouring *parganá*s of Páli and Sára.

Saromannagar.—Town in Hardoi District, and head-quarters of Saromannagar *parganá*; situated 6 miles south of Sháhábád, and 15 miles north-west of Hardoi town. Population (1881) 1033, namely, Hindus 936, and Muhammadans 97. Village school. Bi-weekly market.

Sársa.—Town in Anand Sub-division, Kaira District, Bombay Presidency; situated 28 miles east by south of Kaira town, in lat. 22° 33' N., and long. 73° 7' E. Population (1872) 5218; not separately returned in the Census Report of 1881. The centre of the cotton trade of the District.

Sarsaganj.—Trading village in Mánpuri District, North-Western Provinces; situated in lat. 27° 3' N., and long. 78° 43' 50" E., on the Etáwah road, 6 miles north of the Bhadan station of the East Indian Railway, and 27 miles south-west of Mánpuri town. Population (1881) 5814, namely, Hindus, 4902; Muhammadans, 767; and 'others,' 145.

The village of Sarsa (population 2126) is a collection of mere agricultural hamlets, containing a large fortified brick house, belonging to a family of Kirār Thākurs; but the real importance of the place centres in the neighbouring *bsār* of Sarsaganj, the principal trading market of the District, and the only one which carries on business with surrounding towns. Fine market-place, known as Raikes-ganj; bi-weekly fair; large trade in cotton. Wealthy merchants, chiefly Jains; several Jain temples; very handsome little mosque of peculiar architecture. Large cattle market. Police station, post-office, village school. A small house-tax is levied for police and conservancy purposes.

Sarsāwa.—Ancient town in Sahāranpur District, North-Western Provinces. Distant from Sahāranpur town 10 miles west, upon the Ambāla (Umballa) road. Population (1881) 3978. Small trade to and from the Punjab. Chiefly remarkable for its historical associations, being identified by General Cunningham with Sharwa or Sharashāraha, the city of Rājā Chand, sacked by Mahmūd of Ghaznī in 1019 A.D. The Rājā fled to the hills after the fall of his fort; but Mahmūd followed up the fugitives, defeated them in the midst of a forest, and captured an enormous booty in gold, silver, precious stones, and slaves. Police station, post-office, village school.

Sarsutī.—River in the North-Western Provinces, Punjab.—See SARASWATĪ.

Sāru.—The loftiest hill in Chutā Nāgpur, Bengal; situated in Lohārdagā District, west of Rānchī town, 3615 feet in height. Lat. 23° 30' N., long. 84° 30' 45" E.

Sarvasiddhī.—*Tāluk* or Sub-division of Vizagapatam District, Madras Presidency. Area, 311 square miles. Population (1881) 131,754, namely, males 65,395, and females 66,359, occupying 27,868 houses in 150 villages. Hindus number 129,018; Muhammadans, 2709; Christians, 19; and 'others,' 8. The *tāluk* in olden times formed a *zamindārī*, which was purchased by Government for £75 in 1831. It is near the coast, and contains some of the best wet crop land in Vizagapatam District, but it is liable to sudden and injurious rains. In 1883 the *tāluk* contained—criminal courts, 2; police circles (*thānds*), 6, regular police, 54 men. Land revenue, £14,375. Head-quarters Yelamanchili.

Sarvepallī.—Town in Gudūr *tāluk*, Nellore District, Madras Presidency. Lat. 14° 17' 30" N., long. 80° 0' 40" E. Population (1881) 4929, namely, Hindus, 4624; Muhammadans, 300, and Christians, 5. Number of houses, 965. Sarvepallī contains the ruins of an old Rohilla fort. Its irrigation tank is one of the finest in the District, and is filled from the Penner (Ponnaiyār) anicut.

Sarwān.—Village in Unao District, Oudh; situated in lat. 26° 36' N., and long. 80° 56' E., 6 miles north-east of Purwā, and 26 miles east

at Novo Selo. Tuzlata, 1881, 202, 203, 204, and
 Tuzlata 1882. A very ancient village, it is a noted shrine temple.
 Concerning this temple, Dr. C. A. Wilson relates the following
 incident in his *Travels in Turkey*, p. 100: "A crowd in this
 temple, and to stone and burn it the wild Arab country around, came
 from Tuzlata and Kuchuk the district of Belgrade, the great
 Serbs and Bulgars. He was employed as servant on the night of a raid
 by night came servants, and from Kuchuk (near Kuchuk), by
 night a band. He was going in pilgrimage, and was carrying his
 hand knife and another in a jar of oil, and was in his pocket.
 Hearing the noise, he put his dagger down and stepped to meet
 him. Tuzlata heard a rushing noise and running, and some wild
 boys took up his bow and shot an arrow, which struck Servat and
 he died. Then his hand passed in their hands and in their hands
 and carried the man, who had done the thing. They put it down as
 he had said the son, who was the light of their hearts, so he might
 be a friend and servant from his own children, and might be a friend
 over as they were dying. Hearing so sad, they put up the groans
 and from that day to this the Tuzlata has a light in the tower which
 is burning in the open air, and is called Servat. Every day a crowd of
 men has gathered there in one way or another. The man remains in
 the air, and by it he has made a tree the roots of Servat, a figure of
 some kind, and is he dead but his image is preserved, so it is a source of
 joy to the people, of the light and the air which is filled up, and is
 indispensable in its demand."

Sarajevo.—Town in Herzegovina, Bosnia, 1878, 202, 203, 204, and
 by miles southeast of Tuzlata. Population, 1881, 202, 203, 204,
 1882, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

Sarajevo.—Large town in Herzegovina, Bosnia, 1878, 202, 203, 204, and
 miles south of Tuzlata. Population, 1881, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

cultivate about 4600 *bighás*, giving an average annual out turn of about 530 *maunds* of dye.

Sásni (*Sásani*)—Town in Aligarh District, North-Western Provinces. Lat. $27^{\circ} 42' 12''$ N., long. $78^{\circ} 8' 5''$ E. Distant from Aligarh town 14 miles south on the Agra road, from Háthras 7 miles north. Population (1881) 4851. Steadily declining in importance. Remains of ancient fort, which held out under its chief against Lord Lake in 1803, when it was captured, not without considerable loss. Monuments in memory of the officers killed in the attack. Indigo factories, built from the materials of the fort. Police station, post-office, encamping ground for troops. A small house-tax is levied for police and conservancy purposes.

Sásserám.—Sub-division of Sháhábád District, Bengal; lying between $24^{\circ} 31'$ and $25^{\circ} 22' 30''$ N. lat., and between $83^{\circ} 33'$ and $84^{\circ} 30'$ E. long. Area, 1493 square miles; villages, 1986; houses, 77,618. Population (1881) 519,207, namely, males 253,757, and females 265,450. Hindus number 475,395; Muhammadans, 43,748; Christians, 44; and 'others,' 20. Average density, 348 persons per square mile; villages per square mile, 1'33; persons per village, 261; houses per square mile, 57; persons per house, 6'7. This Sub-division consists of the 4 police circles of Sásserám, Khargarh, Dhangáin, and Dehri. In 1870-71 it contained 1 civil and 2 criminal courts, a regular police force of 141, and a village watch of 1713 men.

Sásserám.—Chief town of Sásserám Sub-division, Sháhábád District, Bengal; situated on the Grand Trunk Road, 61 miles south of Arrah, in lat. $24^{\circ} 56' 59''$ N., and long $84^{\circ} 3' 7''$ E. Population of Sásserám village (1881) 2531, of the municipality, 22,000. Municipal income (1883-84), £1499, of which £761 was derived from taxation; average incidence of taxation, 8½d. per head. The name Sásserám or Sahsrám signifies one thousand toys, because a certain Asur or infidel who lived here had a thousand arms, each holding a separate plaything. The town, now fast declining in importance, is noted as containing the tomb of the Afghán Sher Sháh, who conquered Humáyún, and subsequently became Emperor of Delhi. His mausoleum is at the west end of the town, within a large tank, the excavated earth of which has been thrown into unshapely banks some distance off. The tomb itself consists of an octagonal hall surrounded by an arcade, which forms a gallery; the roof is supported by four Gothic arches; the ornaments are in the very worst taste. It is now being repaired at Government expense. (For full details respecting this monument, see *Statistical Account of Bengal*, vol. xii. pp. 205-208). The remarkable mosque of Chandan Shahid is situated on a lofty hill east of the town.

Sasu.—River in the south of Lakhimpur District, Assam.—See SECA.

Sáswar (*Sasar*).—Chief town of the Purandhar Sub-division of Poona (Púna) District, Bombay Presidency; situated on the left bank of the river Kárha 16 miles south-east of Poona city, in lat. $18^{\circ} 20' 20''$ N., and long. $74^{\circ} 4' 20''$ E. Population within municipal limits (1881) 5684, namely, Hindus, 5411; Muhammadans, 249; and Jains, 24. Sáswar was the original Deccan home of the Peshwá's family. Beyond the town, across the river Kárha, stands the palace of the old Peshwá, now used for the Collector's office. Near the junction of the Kárha and one of its minor tributaries is a walled building, the palace of the great Bráhma family Purandhare of Purandhar, whose fortunes for upwards of a century were closely connected with those of the Peshwás. This latter palace was formerly strongly fortified, and in 1818 was garrisoned and held out for ten days against a detachment of British troops. About 1840 the Mirs of Sind were confined in Sáswar. Municipal income (1883-84), £336; incidence of taxation, 1s. $1\frac{1}{2}$ d. per head. Dispensary, post-office, and two schools.

Sata.—Channel of the Indus in Sind, Bombay Presidency. The most important eastern branch of the river, that to the west being known as the BAGHAR. The Sata sends off, on the left or eastern side, two branches, the Mal and the Manti, both of which are now only shallow streams. Before the great earthquake that occurred in Cutch (Kachchh) in 1819, vessels from seaward entered the Richal mouth, the only accessible entrance, and passed into the Hajámro through what was then the Khedewári creek, and thence into the Mal to Sháhbandar, an important naval station under the Kalhora princes. This passage was closed by the earthquake, and a new mouth opened, viz. the Kukaiwári, which in 1867 was found to be completely choked by sand. The Khedewári was described by Lieutenant Carless in 1837 as having a depth of from 16 to 18 feet, but since 1845 the Hajámro had taken its place as the main channel.

Sátána (or *Báglan*).—Sub-division of Násik District, Bombay Presidency. Area, 619 square miles. Population (1881) 64,875, namely, males 32,885, and females 31,990, occupying 9992 houses in 155 villages. Hindus number 48,972; Muhammadans, 1678; and 'others,' 14,225. The chief river is the Mosam. The route from the Deccan through Sátána to the Gujarát coast has been a line of traffic from remote times. Akbar, when he conquered Khándesh in 1599, attempted to capture Sátána, and besieged the chief Pratápsáh for seven years unsuccessfully, and was in the end obliged to compound with him. In 1637, Sátána was attacked by Aurangzeb. The chief submitted and was made commander of 3000 horse. Sátána formed part of Khándesh District till 1869, when it was transferred to Násik. In 1875, Sátána, with its two petty divisions of Jaikhedan and Abhona, was divided into two Sub-divisions, Sátána (or Báglan) and

Kalwan. In 1880-81, 6658 holdings or *khatas* were recorded, with an average area of 26½ acres, paying an average assessment of £2, 2s. 6d. The area under cultivation in 1880 was 145,763 acres. Cereals and millets occupied 106,578 acres; pulses, 22,882; oil-seeds, 15,475; fibres, 500; and miscellaneous crops, 1756 acres. In 1883 the Sub-division contained 1 civil and 2 criminal courts; police circles (*thánás*), 2; regular police, 63 men; village watch (*chaukidárs*), 306.

Sátána.—Town in Sátána or Bágán Sub-division, Násik District, Bombay Presidency; situated about 30 miles west of Málegáon. Population (1881) 3516. Dispensary, post-office, annual fair.

Sátánones.—Petty State in the Gohelwár *prant* or division of Káthiáwár, Bombay Presidency; consisting of 1 village, with 2 shareholders or tribute-payers. Area, 67 square miles. Population (1881) 411. Estimated revenue, £95, of which £10, os. 6d. is paid as tribute to the Gáekwár of Baroda, and 12s. to the Nawáb of Junágarh.

Satanwári.—Fort in Bhopál State, Central India Agency; situated in lat. 23° 36' N., and long. 77° 10' E., 30 miles north-west of Bhopál town, close to the Gwalior frontier. Satanwári appears, says Thornton, to have been granted with other possessions in 1818 by the British Government to the Nawáb of Bhopál, 'in order to mark its approbation of his conduct, and to enable him to maintain the stipulated contingent.'

Sátára.—British District in the Deccan or Central Division of the Bombay Presidency, lying between 16° 51' and 18° 10' 30" N. lat., and between 73° 37' and 74° 58' E. long. Area, 4988 square miles. Population (1881) 1,062,350 souls. It is bounded on the north by the States of Bhor and Phaltan, and the Níra river separating it from Poona; on the east by Sholápur District and the estates of the Panth Pratinidhi and the chief of Ját; on the south by the river Várna, separating it from Kolhápur and Súngli States, and by a few villages of Belgáum District; and on the west by the Sahyádrí range of hills, separating it from the Konkan or southern Districts of Kolába and Ratnágiri. The administrative head-quarters are at SATARA TOWN.

Physical Aspects.—From Mahábaleshwar in the north-west corner of the District, 4717 feet above the sea, start two hill ranges of equal height and nearly at right angles to each other—one the main range of the Sahyadris, running towards the south and forming the western boundary of the District; and the other the Mahadeo range of hills, which, going first in an easterly and then in a south-easterly direction, extends towards the eastern boundary, where it sinks gradually into the plain. These hills throw out numerous spurs over the District, forming the valleys of the several streams which make up the head-waters of the Kistna, one of the largest rivers in Western India. Except near Mahábaleshwar, and in the valley of the Koina, the hills of the

District are very low, and have a strikingly bare and rugged aspect. The Mahádeo range, even in the rainy season, is but scantily covered with verdure. The hills are bold and abrupt, presenting in many cases bare scarps of black rock, and looking at a distance like so many hill fortresses. They consist of trap, intersected by strata of basalt and topped with laterite.

Of the different soils on the plains, the commonest is the black loamy clay containing carbonate of lime. This is very fertile, and when well watered is capable of yielding heavy crops. Red clay is found near the foot of the hills. Besides many soils of a light and dark brown colour, white nodules of pure lime, and also light brown loam with a large proportion of lime, are often met with in the east.

The water-supply, especially in the west, is tolerably plentiful; but in the east, during the hot weather there is great scarcity. The supply comes partly from rivers and partly from numerous ponds and wells. Almost all the rivers rising near Maháleshwar on the Sahyadri range, or in the Mahádeo Hills, flow directly or indirectly into the Krishna. Except a small area in the north and north-east that drains into the Bhima, the District of Satara is the head valley of the Krishna river. Down the centre, with a general slope to the south and south-west, along a valley which slowly opens into a plain, the Krishna flows first to the south and then to the east, passing across the whole District from its north-west to its south-east corner. From the central plain of the Krishna eight valleys branch to the hills. Some of the streams of these valleys hold water only for a short time after the rains; but by throwing temporary dams across them and leading their water into canals, they are much utilized for irrigation. During the hot season, most of the ponds and wells become dry.

The city of SATARA receives its supply through pipes from a reservoir on the Entoshwar Hill, built by Rájá Pratap Singh. Scarcity of water is, however, felt in the city during the hot season, and steps are being taken to increase the supply by improving some of the reservoirs. Irrigation works have been constructed on the Krishna near Karad, on the Verla at Khategaon, on the Nira near Máshiras, on the Man, on the Varsa, on the Vang, and on the Nandni.

The whole of Satara falls within the Deccan trap area. As in other parts of the West Deccan, the hills are layers of soft or amygdaloid trap, separated by flows of hard basalt and capped by laterite or iron clay.

Iron and copper ore, found in abundance on the Maháleshwar and Mahádeo Hills, were formerly worked by the Musalmán tribe of Dhavdás. Owing, however, to the fall in the value of iron and the rise in the price of fuel, smelting is now no longer carried on.

Forests cover an area of 662 square miles, or 13½ per cent. of the total area. Almost the whole of the District is hilly. The forests

are scattered over the District, and are much broken by private and cultivated land. In the west, the belt of evergreen forest along the line of the Sahyádris is divided into six forest ranges. These six ranges are fairly compact, with little cultivated land between. The seven eastern forest ranges are bare hills, with here and there a little scrub and teak. The forests of the western Sub-divisions have a large store of timber and firewood. *Jámbul* (*Eugenia jambolana*), *gela* (*Vangueria spinosa*), and *pesha* (*Cylicodaphne wightiana*) grow on the main ridge of the Sahyádris, and small teak on the eastern slopes. Sandal-wood is occasionally found, and the mango, jack, and guava are often grown for their fruit. Patches of bamboo sometimes occur. The cinchona plantation, established in Lingmala near Mahábaleshwar, has proved a failure.

Of wild animals, tigers, bears, hyænas, bison, wild boar, and *sámbar* deer are found only in the western hills, and hares and jackals throughout the District. The once famous breed of horses in the Nira valley has degenerated, and Government efforts to improve it have so far met with little success.

History.—It seems probable that, as in the rest of the Bombay Deccan and Konkan, the Andhrabhritya or Shátakarni kings (B.C. 90–A.D. 300), and probably their Kolhápúr branch, held Sátára till the third or fourth century after Christ. For the 900 years ending early in the fourteenth century with the Muhammadan overthrow of the Deogiri Jádhas, no historical information regarding Sátára is available; and the Deonágari and Kánarese inscriptions which have been found on old temples have not yet (1885) been translated. Still, as inscribed stones and copper-plates have been found in the neighbouring Districts of Ratnágiri and Belgáum and the State of Kolhápúr, it is probable that the Early and Western Chálukyas held Sátára District from about 550 to 760; the Ráshtrakutas to 973; the Western Chálukyas, and under them the Kolhápúr Siláharás, to 1220; and the Deogiri Jádhas till the Muhammadan conquest of the Deccan about 1300.

The first Muhammadan invasion took place in 1294, and the Jádhav dynasty was overthrown in 1318. The Muhammadan power was then fairly established, and in 1345 the Bahmani dynasty rose to power. On the fall of the Bahmanís towards the end of the 15th century, each chief set up for himself; the Bijápúr kings finally asserted themselves; and under the Bijápúr kings the Maráthás arose. Sátara, with the adjacent Districts of Poona and Sholápúr, formed the centre of the Maráthá power. The history of that power belongs to the general annals of India. Its founder, Sivají, commenced his career as a free-lance about the year 1644; and during the remainder of the century, his family rapidly aggrandized itself at the expense both of the Bijápúr King and of the Delhi Emperor.

The general decay of the Mughal Empire from 1700 to 1750 opened the way for the Maráthá supremacy. The Peshwás, or Mayors of the Palace, date their power from Balaji, about 1718. In 1749, the sovereignty passed from the Sátára Rájás to the Bráhmaṇ Peshwás, with their head-quarters in the adjoining District of Poona. The descendants of Sivaji became little more than pensioned prisoners, but they clung to the title of Rájá of Sátára. The battle of Pánipat in 1761 broke the power of the great Maráthá confederacy. But the Peshwás still remained the most important native rulers in India till the rise of Haider Ali.

Repeated wars with the English ended in the final defeat of the Peshwá's army at Ashti in 1818. His territory was thereupon annexed; but the English, with a politic generosity, freed the titular Maráthá Rájá (the descendant of Sivaji) from the Peshwá's control, and assigned to him the principality of Sátára. Captain Grant Duff was appointed his tutor until he should gain some experience in rule. In April 1822, the Sátára territory was formally handed over to the Rájá, and thenceforward was managed by him entirely. After a time, he became impatient of the control exercised by the British Government; and as he persisted in intriguing and holding communications with other princes, in contravention of his treaty, he was deposed in 1839, and sent as a State prisoner to Benares, and his brother Sháhji was placed on the throne. This prince, who did much for the improvement of his people, died in 1848 without male heirs; and after long deliberation, it was decided that the State should be resumed by the British Government. Liberal pensions were granted to the Rájá's three widows, and they were allowed to live in the palace at Sátára. The survivor of these ladies died in 1874.

Population.—The Census returns of 1872 showed a total population of 1,116,050; that of 1881 a total of 1,062,350, residing in 14 towns and 1329 villages, and in 151,173 houses; unoccupied houses numbered 23,233. Area, 4988 square miles. Average density of population, 212.98 persons per square mile; villages per square mile, 0.27; houses per square mile, 34.9; persons per village, 791.03; and persons per house, 7.02. Classified according to sex, there were 532,525 males and 529,825 females; proportion of males, 50.1 per cent. Classified according to age, there were—under 15 years, boys 220,901, and girls 199,697; total children, 420,598, or 39.6 per cent.: 15 years and upwards, males 311,624, and females 330,128; total adults, 641,752, or 60.4 per cent. of the population. Classified according to religion, Hindus numbered 1,008,918; Muhammadans, 36,712; Jains, 15,679; Parsís, 99; Christians, 886; Jews, 21; Sikhs, 29; and Buddhists, 6.

The Hindus were divided into the following main castes and social distinctions.—Bráhmaṇs (priestly caste), 48,362; Rájputs (warrior caste),

1328; Chamárs, 16,105; Darjís (tailors), 9664; Dhangars, 41,547; Dhobís (washermen), 7640; Nápits (barbers), 14,251; Jangams, 3796; Kunbís (cultivators), 583,569; Kolís (cultivators), 4198; Kumbhárs (potters), 12,321; Koshtís, 8632; Lingáyats (traders), 17,035; Lohárs (blacksmiths), 5193; Mállís (gardeners), 24,784; Mángs (depressed caste), 20,919; Mhárs (depressed caste), 87,679; Sonárs (goldsmiths), 8231; Sutárs (carpenters), 11,043; Tellís (oilmen), 9499; Banjárárs, 2046; and 'others,' 71,076. The Muhammadan population consisted of—Patháns, 3780; Sayyids, 4235; Shaikhs, 27,979; and 'others,' 718. According to sect,—Sunnís, 36,109; Shiás, 546; and 'others,' 57. The Christian population of Sátára District included—Europeans, 407; Eurasians, 19; and natives, 460. Adopting another system of classification, there were—Roman Catholics, 387; followers of the Church of England, 317; and followers of other Christian creeds, 182.

Of the Hindus, who form the great majority of the population, more than a half consist of Kunbís, who during the period of Maráthá ascendancy (1674–1817) furnished the bulk of the armies. The Mávlás, Sivaji's best soldiers, were drawn from the *ghátmátha* (hill-top) portion of the District. During the last half-century they have become quiet and orderly, living almost entirely by agriculture. Dark-skinned and, as a rule, small, they are active and capable of enduring much fatigue. Bráhmans, employed as priests or Government servants, are found in large numbers in the towns of Sátára and Wái. Besides these, Vánís, Dhangars, Rámosís, Mhárs, and Mángs are among the principal castes met with throughout the District.

With reference to occupation, the Census of 1881 divided the male population into the following six main groups:—(1) Professional class, including State officials of every kind, and members of the learned professions, 18,118; (2) domestic servants, inn and lodging-house keepers, 4872; (3) commercial class, including bankers, merchants, and carriers, 4086; (4) agricultural and pastoral class, including gardeners, 241,526; (5) industrial class, including all manufacturers and artisans, 46,257; and (6) indefinite and non-productive classes, comprising general labourers, male children, and persons of unspecified occupation, 217,666.

Of the 1343 towns and villages in Sátára in 1881, 289 contained less than two hundred inhabitants; 410 from two to five hundred; 331 from five hundred to one thousand; 224 from one to two thousand; 49 from two to three thousand; 28 from three to five thousand; 8 from five to ten thousand; 3 from ten to fifteen thousand; and 1 from twenty to fifty thousand. Municipal towns—Sátára (1881), 28,601; Wai, 11,676; Karád, 10,778; Tásgáon, 10,206; Ashta, 9548; Islampur, 8949; Rahimatpur, 6082; Mhaswad, 5581; Vita, 4477; Malcolmpet, 3248; Mayni, 2997; Pusesavli, 2569; Shingnápur, 1167.

Agriculture.—Agriculture, the main occupation of the people, supported in 1881, 744,013 persons, or 70·0 per cent. of the population; 374,576 only were agricultural workers. Of the total area of the District (5378 square miles), 3385 square miles are cultivated, of which 73 square miles are non-revenue-paying. Total amount of Government assessment, including local rates and cesses on land, £166,323; average incidence of assessment, including local rates and cesses, 1s. 4½d. The average area of cultivable and uncultivated land per agricultural worker is 5·9 acres.

The bulk of the Sátara landholders are Maráthá Kumbís. But the best class of husbandmen are the Jains of the south and south-west of the District. In the east of the District, the landholders are said to be only moderately hard-working; and the richer soils in the west are said to suffer from being cropped several years in succession without fallow. At the same time, certain parts of the District show notable instances of skill and enterprise. Sátara suffered from the famine of 1876–78; and the indebtedness of the people to the money-lenders has demanded special steps to be taken to preserve their position as peasant proprietors, by the introduction of the Deccan Agriculturists Relief Act. The soils of the District belong to three main classes, red in the hills, and black and light coloured in the plains. The black soil, especially along the valley of the Kistna and its tributaries, is very fertile, yielding two crops a year.

According to the Revenue Survey, of the total area of Government land (2,442,503 acres), 1,802,156 acres, or 73·8 per cent., are cultivable; 141,291 acres are uncultivable; 4956 acres are under grass; and 387,715 acres are forest. Of the whole cultivable area, 1,378,659 acres were held for tillage in 1882–83, namely, 43,462 acres garden land, 14,895 acres rice land, and 1,320,302 acres under dry crops. In 1882–83 the number of holdings was 120,158, with an average area of 14½ acres.

Jodr (*Sorghum vulgare*) and *bájra* (*Penicillaria spicata*), the staple food of the people, occupy nearly half the cultivated area. Rice-fields are found only in the west, along river banks. In the south and east, cotton is grown, most of it of a local variety, but some brought from Hinganghát. Near Mahábaleshwar, several European vegetables, especially potatoes, grow freely, and to a great extent supply the Bombay market. In some of the hill villages, which have a heavy rainfall, *nachni* (*Eleusine corocana*) and *vari* (*Panicum miliare*) are raised on the *kumari* system, that is, by cutting down and burning brushwood and sowing the seeds in the ashes. This practice, formerly general, has, on account of the damage it does to the forests, been to a large extent prohibited.

In 1882–83, 1,113,911 acres were under cultivation, of which 39,757 were twice cropped. Grain crops, consisting chiefly of *jodr* and *bájra*,

occupied 898,206 acres; pulses, 159,211 acres; oil-seeds, 42,001 acres; fibres, 22,581 acres, of which 19,015 were under cotton; orchards, 3952 acres; drugs and narcotics, 8035 acres, of which 7523 acres were under tobacco; and miscellaneous crops, 19,682 acres.

In 1882-83, the prices of produce per *maund* of 80 lbs. were—wheat, 6s. 8½d.; rice (common), 7s. 4d.; *batjra*, 3s. 8½d.; *jodr*, 3s. 4½d.; *dál*, 5s. 3d.; salt, 6s. 5d.; flour, 7s. 6½d.; *ghí*, £3, 1s. 9½d. The wages per diem of a skilled labourer were 6d. to 2s.; of an unskilled labourer, 1½d. to 9d.; the hire per diem of cart, 1s. to 1s. 6d.; of bullocks, 6d. to 1s.

In 1882-83, the agricultural stock consisted of—bullocks, 243,424; cows, 141,139; buffaloes, 110,479; horses, 12,797; sheep and goats, 396,994; ploughs, 48,981; carts, 17,387.

Irrigation.—In 1883, Sátára District had six large irrigation works. These are the Revári canal on the Vásna, the Yerla canal, the Gondoli canal on the Mán, the Máni reservoir on the Váng, the Chikhli canal on the Nándni, and the Kistna canal. The Revári canal is an old work restored, while the other five are new works. The Kistna canal, which has its source in the Sahyádrí hills, has an unfailing supply of water, while the others depend on the local rainfall. The total irrigable area is 47,145 acres; in 1882-83, 5550 acres were watered. Besides these works, the Mhaswad lake is being built as a separate irrigation work on the lower Mán. In an average year the water-supply from this lake would suffice for an area of 30,000 acres. The work may be said to protect an area of 90,000 acres, one third of which may be watered every year. The country under command of this canal stands in great need of water, as its rainfall is very uncertain.

Natural Calamities.—The uncertain and scanty rainfall makes eastern Sátára one of the parts of the Bombay Presidency most liable to suffer from failure of crops. The earliest recorded is the famous famine known as Durgá Deví, which, beginning in 1396, is said to have lasted twelve years, and to have spread over all India south of the Narbadá river. Whole Districts were emptied of their people; and for upwards of thirty years, a very scanty revenue was obtained from the territory between the Godávári and the Kistna rivers. In 1520, mainly owing to military disturbances, the crops in the Deccan were destroyed, and a famine followed. In 1629-30, severe famine raged throughout the Deccan. The rains failed for two years, causing a great loss of life. According to local tradition, the famine of 1791-92 was the severest ever known. It seems to have come after a series of bad years, when the evils of scanty rainfall were aggravated by disturbances and war. The native governments granted large remissions of revenue, the export of grain was forbidden, and a sale price was fixed. Rice was brought from Bengal to Bombay.

The famine of 1802-03 ranks next in severity to that of 1791-92.

It was most felt in Khándesh, Ahmadnagar, Sholápur, Bijápur, and Dhárwár; but it also pressed severely on Belgaum, Sátára, Poona, Surat, and Cutch. This scarcity was mainly due to the ravages of Jaswant Ráo Holkar and his Pindáris, who destroyed the early crops as they were coming to maturity, and prevented the late crops being sown. This scarcity was followed by the failure of the late rains in 1803. The pressure was greatest in July and August 1804, and was so grievous that, according to tradition, men lived on human flesh. Grain is said to have been sold at a shilling the pound. In 1824-25, a failure of the early rains caused considerable and widespread scarcity. In 1862, a scanty fall of rain caused another scarcity.

The scanty and badly distributed rainfall of 1876 led to a failure of crops, and to distress amounting to famine over about one-half of the District. The east and south-east suffered most. In addition to this failure of the early rains, September and October passed with only a few showers, and but a small area of late crops was sown. With high prices, mullet at seventeen instead of thirty-five pounds per rupee, and no demand for field work, the poorer classes fell into distress. The need for Government help began about the beginning of October. The long period of dry weather in July and August 1877 forced prices still higher, and caused much distress and suffering; but the plentiful and timely rainfall of September and October 1877 removed all cause of anxiety. By the close of November, the demand for special Government help had ceased. A special Census taken on the 19th May 1877, when famine pressure was general and severe, showed that of 46,235 labourers, 44,344 were on public and 1891 on civil works. As regards their occupation, 3062 were manufacturers or craftsmen, 24,611 were holders or under-holders of land, and 18,562 were labourers. The total cost of the famine was estimated at £118,137. In the eastern Sub-divisions the number of cattle fell from 994,272 in 1876-77 to 775,393 in 1877-78. In 1878, the tillage area fell short of that in 1876 by about 18,400 acres.

Commerce and Manufactures.—Besides *kamblis* (blankets) and coarse cotton cloth, the chief exports of the District are grain, tobacco, oil-seeds, chillies, molasses, and a little raw cotton. The imports are—European piece-goods, hardware, paper, dried fruits, refined sugar, and salt. Weekly or bi-weekly markets are held in large villages and towns. Of these, Mhaswad is famous for its blankets, and Belandi for its cattle. Cotton is spun by women of the Kunbí, Mhár, and Máng castes. The yarn thus prepared is made up by Hindu weavers of the Sáli or Koshtí caste, and by Muhammadans, into cloth, tape, and ropes. Blankets (*kamblis*), which command a large sale, are woven by men of the Sangar caste. Sátára brass dishes and Shirol lamps are well known throughout the Deccan. Notwithstanding the great number of carpenters, wheels

and axles for cart-making have to be brought from Chiplún in Ratnágiri. Paper is still manufactured to some extent.

Means of Communication.—Of the several lines of road in Sátára, extending over a total length of 956 miles, the Poona and Belgáum road, crossing the District from north to south and bridged and metalled throughout, is the most important. One branch of this line breaks off at Karád, and runs along the valley of the Koina to Chiplún; while two other branches from Surúl and Sátára town, passing by Wái, go in the direction of Mahábaleshwar and then towards Mahád, a Konkan seaport. The old Poona road by the Salpa Pass is now almost abandoned. Of the other lines that cross the District from east to west, the chief are the Pandharpur road and the two Tásgáon lines, one from Sátára town and one from Karád. Along these and the Belgáum line, a large bullock-cart traffic passes. Within the limits of the District, the Sahyádrí hills are crossed by thirteen roads or bullock tracks, of which the principal are the Kamatgi, Pasarni, Kumbhárli, Varándha, and Fitzgerald. Besides houses for the use of District officers when on tour, village offices, *cháudis*, and temples, there are 243 *dharmaśálas* or rest-houses for the accommodation of travellers. The West Deccan line of the Southern Maráthá Railway, now under construction, will pass south and south-east through the centre of the District.

Administration.—The total revenue raised in 1882-83 under all heads, imperial, local, and municipal, amounted to £227,403, showing on a population of 1,062,350 an incidence of 4s. 3d. per head. The land-tax forms the principal source of revenue, amounting to £154,790, or 72·6 per cent. of the total amount. The other chief items are stamps, excise, forest, and local funds. The District local funds, created since 1863 for works of public utility and rural education, yielded £18,919. The 13 municipalities contain an aggregate population of 108,259 persons. Their aggregate receipts amounted in 1882-83 to £20,372, and the average incidence of taxation varied from 3d. to 10s. 5d. per head of population.

The administration of the District in revenue matter is, exclusive of the Superintendent of Malcolmpet, entrusted to a Collector and 6 Assistant Collectors, four of whom are covenanted civilians. For the settlement of civil disputes there are 8 courts. Thirty-nine officers share the administration of criminal justice. The total strength of the regular police force consisted in 1882 of 177 officers and 776 constables, giving 1 policeman to every 1113 persons of the population. The total cost was £15,120, equal to £3, 3s. per square mile of area and 3½d. per head of population. Besides the lock-up at each *indm-lafdar's* office, there is a District jail at Sátára, and three subordinate jails at Karád, Khatío, and Tásgáon. The number of convicts in the Sátára jail on the 31st December 1882 was 84, of whom 24 were

females; the number of convicts admitted during the year being 297.

Compared with 114 schools and 1168 pupils in 1865, there were in 1877, 219 schools with a roll-call of 10,435 names. By 1882-83, the number of schools had reached 248, with 14,498 names, and an average attendance of 10,875. The first girls' school was opened in the town of Sátára in 1865. In 1882-83, the number of girls' schools was 5, with an average attendance of 260. The Census Report of 1881 returned 13,719 boys and 182 girls as under instruction, besides 27,678 males and 209 females as able to read and write, but not under instruction. Three vernacular papers, two of which have occasional English contributions, were published in Sátára District in 1882-83.

Medical Aspects.—According to the height and distance from the sea, the climate varies in different parts of the District. In the east, especially in the months of April and May, the heat is considerable. But near the Gháts it is much more moderate, being tempered by the sea-breeze. Again, while few parts of Western India have a heavier and more continuous rainfall than the western slope of the Sahyádrí hills, in some of the eastern Sub-divisions the supply is very scanty. The average annual rainfall at Mahábaleshwar is more than 252·8 inches, while in Sátára town it is only 40 inches, and in some places farther east it is less than 12. The west of the District draws almost its whole rain supply from the south-west monsoon, between June and October. Some of the eastern Sub-divisions, however, have a share in the north-east monsoon, and rain falls there in November and December. The May or 'mango showers,' as they are called, also influence the cultivator's prospects.

Seven dispensaries and 2 civil hospitals, one at Sátára and the other at Malcolmpet, afforded medical relief to 477 in-door and 41,499 out-door patients in 1882-83, and 32,422 persons were vaccinated. Vital statistics showed a death-rate of 22·6 per thousand in 1882-83. [For further information regarding Sátára District, see the *Gazetteer of Bombay Presidency*, published under Government orders, and compiled by Mr. J. M. Campbell, C.S., vol. xix., Sátára District (Government Central Press, Bombay, 1885). Also the *Bombay Census Report* for 1881; and the several Administration and Departmental Reports of the Bombay Government from 1880 to 1884.]

Sátára.—Chief town of Sátára District, Bombay Presidency; situated in lat. 17° 41' 25" N., and long. 74° 2' 10" E., 56 miles south of Poona, near the confluence of the Kistna and the Yena, in the highlands of the Deccan, where the country generally inclines towards the east. The strong fort of Sátára, midway between the Kistna and the Tornaghát, is perched on the summit of a small, steep, rocky hill. It takes its name from the seventeen (*sátára*) walls,

towers, and gates which it possessed, or is supposed to have possessed. At the close of the war with the Peshwá, in 1818, it fell, after a short resistance, into the hands of the British, who restored it with the adjacent territory to the representative of Sivaji's line, who, during the Peshwá's ascendancy, had lived there as a State prisoner under the title of the Rájá of Sátára. In 1848, on the death of the last Rájá, the principality reverted to the British. The town of Sátára, lying at the foot of the hill fortress, consisted in 1820 of one long street of tiled houses, built partly of stone and partly of brick. After the breaking up of the Rájá's court, the population considerably decreased. But Sátára is still a large place, ranking as the twelfth city in the Bombay Presidency, with a population in 1881 of 28,601 in the town, and 427 in the military lines; total, 29,028, namely, males 14,892, and females 14,136. Hindus numbered 24,525; Muhammadans, 3596; Jains, 284; Christians, 527; Pársis, 48; and 'others,' 48. Besides the courts of the Sub-divisional and District revenue officers, it possesses a District Judge's Court and a High School. The Rájá's palace is plain and commonplace. Sátára has few large or ornamental buildings, but the town is clean and the streets broad. On account of its high position, 2320 feet above sea-level, and its exposure to the sea-breeze, the climate is unusually pleasant. The water-supply is drawn by pipes from a reservoir on the hill of Enteshwar, and from three masonry ponds in the valley of Krishneshwar.

Sátára Jágirs, The.—Group of Native States in the Bombay Presidency, under the Political Superintendence of the Collectors of Sátára and Sholápur, comprising—Akalkot, Aundh, Bhór, Daphlapur, Jath, and Phaltan. Of these Bhór lies in the north-west of Sátára District, Phaltan in the north, Aundh in the east, Jath in the extreme south-east, Daphlapur also in the south-east, and Akalkot in the south-east of Sholápur. Total area, 3821 square miles. Revenue, about £157,800. The Sátára *jágirs* were feudatory to the Rájá of Sátára, and became tributaries to the British Government on the lapse of that State in 1849. The *jágirdárs* retained all their former rights and privileges, with the exception of the power of life and death, and of adjudicating upon serious criminal cases. Their administration is now conducted on the principles of British law. Criminal and civil justice is administered by the chiefs themselves, with the aid of subordinate courts. In civil suits, special appeals from the decisions of *jágirdárs* lie to the Political Agents. In criminal cases, heinous offences requiring capital punishment or transportation for life are tried by the Political Agents, each assisted by two assessors, the preliminary proceedings being conducted by the *jágirdárs*. Criminal appeals from their decisions also lie to the Political Agents. The Collector of Sátára is in charge of the four *jágirs*

of AUNDH, BHOR, JATH, and PHALTAN, and of the little cluster of six villages (rent-roll of £1300; area, 40 square miles; population (1881) 6007; revenue, £900) belonging to the Bhai Sâhab of Daphlapur, who exercises the powers of a magistrate of the first class, and in civil suits those of a subordinate judge. AKALKOT is under the Collector of Sholâpur. Population (1881) of the Sâtâra *jdârs*, 376,727, namely, males 190,497, and females 186,230, occupying 54,139 houses, in 3 towns and 838 villages. Hindus numbered 354,242; Muhammadans, 16,747; and 'others,' 5738.

Satâsgarh (or '*Sixty Towers*').—Ruin in PANDUAH TOWN, Maldah District, Bengal.—See PANDUAH.

Sâtâgôn (or *Saptagrâm*, 'The Seven Villages,' so called from seven sages who gave their names to the same number of villages).—Ruined town in Hûgli District, Bengal. Lat. 22° 38' 20" N., long. 88° 25' 10" E. The mercantile capital of Bengal from the Purânic age until the foundation of HUGLI by the Portuguese. The decay of this port dates from the silting up of the channel of the SARASWATÎ, and nothing now remains to indicate its former grandeur except a ruined mosque; the modern village consists of a few miserable huts. Sâtâgôn is said to have been one of the resting-places of Bhâgîrathî. De Barros writes that it was 'less frequented than Chutagong, on account of the port not being so convenient for the entrance and departure of ships.' Purchas states it to be 'a fair citie for a citie of the Moores, and very plentiful, but sometimes subject to Patnaw.' In 1632, when Hûgli was declared a royal port, all the public offices were withdrawn from Sâtâgôn, which rapidly fell into ruins. [For a full description of the ancient Sâtâgôn, see *Statistical Account of Bengal*, vol. iii. pp. 307-310.]

Sathamba.—Petty State in Mahî Kântha, Bombay Presidency. Population (1881) 5360. Estimated revenue, £825, of which £40, 2s. is paid as tribute to the Gâekwâr of Baroda, £56, 2s. to Bâlâsinor, and £12, 14s. to Lunâwâra. The chief, Thâkur Ajâb Singh, is a Baria Koli. The family holds no deed allowing adoption; in matters of succession it follows the rule of primogeniture. Area under cultivation, about 5000 acres. Staple crops, rice and *javâr*. One school, with 74 pupils.

Sâthan.—Town in Sultânpur District, Oudh; pleasantly situated on high ground overlooking the Gûmti river, 40 miles north-west of Sultânpur town. Founded by Sâthan, a Bhar, and called after him. After the Mutiny of 1857, a certain Shâh Abdûl Latîf settled here as a 'missionary of pure religion,' and built a mosque, at which hundreds of the Sunnî sect assemble every Friday. The *'Idgâh* of Sâthan is a place of considerable resort for the faithful at the 'Id festival. Population (1881) 1566, namely, Hindus 818, and Muhammadans 748, principally Sayyids and Shaikhs.

Sátkhira.—Sub-division of Khulná District, Bengal, lying between $21^{\circ} 38'$ and $22^{\circ} 56' 45''$ N. lat., and between $88^{\circ} 56' 30''$ and $89^{\circ} 4'$ E. long. Area, 702 square miles; towns and villages, 1155; houses, 59,564. Population (1881) 434,766, namely, males 228,949, and females 205,817; proportion of males, 52.7 per cent. Average number of persons per square mile, 619; villages per square mile, 1.65; persons per village, 376; houses per square mile, 87; inmates per house, 7.3. This Sub-division consists of the 5 police circles of Sátkhira, Káldrod, Mágurá, Káliganj, and Asásuná. In 1884 it contained 2 civil and 4 criminal courts, a regular police of 92 men, and a rural force 810 strong.

Sátkhira.—Chief town of Sátkhira Sub-division, Twenty-four Parganás District, Bengal; situated on the Betná river, in lat. $22^{\circ} 42' 35''$ N., and long. $89^{\circ} 7' 55''$ E. Population (1881) 8738, namely, Muhannadans 4391, and Hindus 4347. Municipal income (1883-84), £406, of which £376 was derived from taxation; average incidence of taxation, 10½d. per head of the population. The town contains many Hindu temples; a large vernacular school or *pathshála*, entirely supported by the *samindár*; and a Government dispensary, in charge of a native sub-assistant surgeon. Once a rural village, Sátkhira is now an important town, a canal having been cut to the Ichámatí river; fair roads lead to the nearest marts of traffic, thus making it an emporium for the sale and shipment of the produce of the surrounding country. Large trade in sugar and rice.

Satlaj.—One of the five rivers of the Punjab.—See **SUTLEJ**.

Satlásna.—Native State in the Political Agency of Mahi Kántha, Bombay Presidency. Population (1881) 3281. The principal agricultural products are millet, wheat, Indian corn, and sugar-cane. The present (1882-83) chief is Thákur Hari Singh, a Hindu of the Parmár Koli tribe. He is thirty-four years of age, and manages his estate in person. He enjoys an estimated gross revenue of £450; and pays a tribute of £168 to the Gáekwár of Baroda, and £73 to the Rájá of Edar. The family of the chief follow the rule of primogeniture in point of succession. There is 1 school in the State, with 43 pupils.

Satodar Wáori.—Petty State in the Hállár *prant* or division of Káthiáwár, Bombay Presidency; consisting of 4 villages, with 4 shareholders or tribute-payers. Area, 13 square miles. Population (1881) 2447. Estimated revenue, £1200; of which £146, 12s. is paid as tribute to the British Government, and £46, 2s. to the Nawab of Junágarh.

Sátpáti.—Port in Thána (Tanna) District, Bombay Presidency; situated about 6 miles north of Máhim. One of the ports of the Tárápur Customs Division. Average annual value of trade for five years ending

1881-82—imports £1831, and exports £6155. The trade in 1881-82 was—imports £2950, and exports £6882.

Sátapura.—Hill range or table-land, which begins at AMARKANTAK and extends westward across the Central Provinces, and beyond them nearly to the western coast. The name was formerly restricted to that portion of the range which divides the Narbadá (Nerbudda) and Tápti valleys; while sometimes the term Vindhya has been extended to include the Sátpuras, together with the parallel range on the northern side of the Narbadá, in one general appellation for the great chain which stretches across Central India and separates Hindustán proper from the Deccan. Geologically, however, the Vindhyan sandstones are entirely distinct from the Mahádeo and other groups which enter into the composition of the Sátpuras; and geographically, the line of demarcation between the two ranges is defined by the well-marked valley of a great river.

Taking Amarkantak as the eastern boundary, the Sátpuras stretch from east to west for about 600 miles, while their greatest breadth from north to south exceeds 100 miles. The range forms a rough triangle. From Amarkantak, 3328 feet above sea-level, an outer ridge runs south-west for about 100 miles to the Saletekri Hills in Bhandará District. This ridge, known as the MAIKAL range, constitutes the base of the triangle. Starting from this base, the Sátapura range shrinks, as it proceeds westward, from a broad table-land to two parallel dorsal ridges, bounding on either side the valley of the Tápti. Just east of Asirgarh occurs a break, through which the Great Indian Peninsula Railway from Bombay and Khándesh to Jabalpur is carried; and ASIRGARH marks the point where the Sátpuras leave the Central Provinces.

Following the range from east to west, the main features which it presents may be thus described. In Mandlá District, the slope is mainly northward towards the Narbadá. There are four principal upland valleys, each sending down a feeder to that river. The eastern valleys are higher than those to the west. Between the Kharmer and Burhner rivers, the country consists of a rugged mass of bare and lofty mountains hurled together by volcanic action. Their general formation is basaltic, intermixed with laterite, with which the higher peaks are capped. The Chaurádádar plateau, 3300 feet high, has an area of 6 square miles.

In Seoni District, the plateaux of Seoni and Lakhnádon are from 1800 to 2220 feet high. The slope of the country is from north to south; and in the lowest watershed, the Waingangá river rises. In Chhindwárá, also, the country slopes southwards. The principal upland valleys are those of the Pench and Kolbirá. The general elevation is about 2200 feet, but the plateau of Motúr attains a height of 3500 feet. In Betúl, the slope to the south continues; and the Tápti rises

and flows in a deep and narrow gorge. In the south-west corner of the District, the hill of Khámlá rises 3700 feet high. To the north of Betúl, spurs from the Sátপুরas occupy a considerable portion of Hoshangábád. Dhúpgarh (4454 feet) is the highest point; and the picturesque plateau of Pachmarhi, 3481 feet above sea-level, covers an area of 12 square miles.

South of Hoshangábád, sandstone and metamorphic rocks emerge, and form a great portion of the hills of the Betúl and Pachmarhi country. To the east, trap predominates. In Nimár District, the wild and barren range which parts the valleys of the Tápti and the Narbadá has an average width of 15 miles. On its highest point stands the fortress of Asírgarh.

West of Asírgarh, the Sátapura hills form a broad belt of mountain land, stretching in a wall-like line along the north bank of the Tápti. They rise from the first range of hills, ridge behind ridge, to the central crest about 2000 feet high, and then slope gently to the Narbadá. The Bombay-Agra trunk road crosses the Sátপুরas farther west. Among the peaks that rise from 3000 to 3800 feet above sea-level, the grandest is TURANMAL, a long, rather narrow table-land 3300 feet above the sea, and about 16 square miles in area. West of Turanmál, the mountain land presents, both towards the Tápti and the Narbadá, a wall-like appearance.

Sátapura.—State forest lying along the southern slopes of the Sátapura hills, in Seoní, Chhindwára and Nágpur Districts, Central Provinces. Area, about 1000 square miles. *Síj* forms the chief growth in the eastern, and teak in the western portion. The proximity of Kámthi (Kamptee) and Nágpur has caused the exhaustion of all but young timber; but what remains is now strictly preserved, and plantation experiments have been conducted at Sukáta and Sitájhari.

Satrikh.—*Parganá* in Bara Banki District, Oudh; bounded on the north by Nawábganj and Partábgarh, on the east by Siddhaur, on the south by Haidargarh, and on the west by Dewa. Area, 46 square miles, or 29,404 acres, of which 19,318 acres are cultivated. Population (1881) 22,570, namely, males 11,492, and females 11,078. Number of houses, 4238. Of the 42 villages comprising the *parganá*, 17 are held in *tilukdári*, 20 in *caminidári*, and 5 in *pattidári* tenure. Government land revenue, £4796

Satrikh.—Town in Bara Banki District, Oudh, and head-quarters of Satrikh *parganá*; situated 5 miles south-east of Bara Banki town, in lat. 26° 51' 30" N., and long. 81° 14' 10" E. Population (1881) 4090, namely, Hindus 2458, and Muhammadans 1632. Number of houses, 843. The town was originally founded by a Hindu Ráji named Sabtrikh, but was captured by the Muhammadans under Sílár Sahu, a brother-in-law of Mahmúd of Ghazni. Sílár Sahu died here, and

an annual fair is held at his shrine, attended by about 18,000 persons.

Satrunjaya (*Shatrunja*).—Sacred hill near Pālitāna, in the Gohelwār *prant* or division of Kāthiāwār, Bombay Presidency.—S. PALITANA TOWN.

Sattanapalli.—*Tiluk* or Sub-division of Kistna District, Madras Presidency. Area, 714 square miles. Population (1881) 110,290, namely, males 53,695, and females 54,595, occupying 18,752 houses in 169 villages. Hindus number 94,862; Muhammadans, 9086; and Christians, 6342. A wide extent of black soil is found in the *tiluk*, producing heavy crops of cotton. In the black soil, gneissic rock protrudes here and there. In this *tiluk* are the fortresses of BELLAMKONDA and Dharanikota near AMRAVATI TOWN. Sattanapalli contained in 1883—criminal courts, 2; police circles (*thānās*), 7; regular police, 53 men. Land revenue, £36,790. Head-quarters at Krossūr; population (1881) 1912, occupying 327 houses.

Sattankulam.—Town in Tenkarai *tiluk*, Tinneveli District, Madras Presidency. Population (1881) 5116, occupying 1261 houses: Hindus number 3697; Muhammadans, 392; Christians, 1019; and 'others,' 8. Important agricultural town, with wealthy inhabitants engaged in money-lending.

Sātūr.—*Tiluk* or Sub-division of Tinneveli District, Madras Presidency. Area, 548 square miles. Population (1881) 150,886, namely, males 73,382, and females 77,504, occupying 31,945 houses, in 2 towns and 212 villages. Hindus number 145,425; Muhammadans, 3052; Christians, 2409. The northern and eastern villages are part of the black cotton plain of Tinneveli District; the southern and south-western consist of red loam and sand. The latter or red soil portion is considerably larger in area than the former. Cotton is the staple produce; and *kamhu* (*Pennisetum typhoideum*) and gram are also grown, as well as tobacco, chillies, and vegetables. About one-fifth of the *tiluk* is *indm*, one-fourth *samindiri*, and the remainder Government. The South Indian Railway main line traverses the *tiluk*. In 1883, Sātūr contained 2 criminal courts; police circles (*thānās*), 9; regular police, 76 men. Land revenue, £21,773.

Sātūr.—Village in Sātūr *tiluk*, Tinneveli District, Madras Presidency; situated on the north bank of Vaipār river, and a station on the South Indian Railway main line, 55 miles north of Tinneveli town. Head-quarters of the *tehsildār* of Sātūr *tiluk*; the sub-magistrate is stationed at VIRUDUPATTI. Population (1881) 2168, namely, Hindus, 1861; Muhammadans, 155; and Christians, 152. Number of houses, 428. Post-office.

Satyamangalam.—*Tiluk* of Coimbatore District, Madras Presidency. Area, 1176 square miles. Population (1881) 151,313, namely,

males 73,762, and females 77,551, occupying 32,489 houses, in 1 town and 184 villages. Hindus number 146,753; Muhammadans, 2724; Christians, 1831; and 'others,' 5. In 1883 the *táluk* contained 3 criminal courts; police circles (*shánús*), 9; regular police, 99 men. Land revenue, £31,537.

Satyamangalam.—Town in Satyamangalam *táluk*, Coimbatore District, Madras Presidency. Lat. $11^{\circ} 30' 20''$ N., long. $77^{\circ} 17' 15''$ E. Population (1881) 3210, inhabiting 634 houses. Hindus number 2899; Muhammadans, 253; Christians, 55; and 'others,' 3. The fort is situated on the Bhaváni river, and was built by the Náiks of Madura. It was taken by the Mysore generals in 1657. Owing to its situation, Satyamangalam was of considerable strategic importance in our wars with Haidar Ali and Tipú. Colonel Wood took the place in 1768, but Haidar recaptured it the following year. In 1790, Colonel Floyd occupied Satyamangalam, and between the fort and Danayakkankottai fought a severe battle with Tipú in the same year, falling back upon Meadow's column, but effecting his retreat with such skill as almost to convert it into a victory. There are two *ghát* roads to the uplands from Satyamangalam—the Gazzahátti and the Hassanúr roads. The latter is the most frequented route into Mysore.

Sauda.—Sub-division and town, Khándesh District, Bombay Presidency.—See SAUDA.

Saugor.—District, Sub-division, and Town, in the Central Provinces.—See SAGAR.

Saugor.—Island at the mouth of the Húglí river, Bengal.—See SAGAR.

Saundatti.—Chief town of the Parasgarh Sub-division of Belgáum District, Bombay Presidency, situated 41 miles east by south of Belgáum town, in lat. $15^{\circ} 45' 30''$ N., and long. $75^{\circ} 9' 40''$ E. Population (1881) 7133, namely, Hindus, 6314; Muhammadans, 690; and Jains, 129. About 2 miles due south of Saundatti are the ruins of an extensive hill fort called Parasgarh, from which the whole Sub-division derives its name. Sub-judge's court, two schools, post-office, and dispensary. About $5\frac{1}{2}$ miles north-west of Saundatti, a large Hindu fair in honour of the goddess Yellamma is held twice a year about the full moon in April or May and in November or December. On each occasion, from 15,000 to 20,000 persons attend. Municipal income (1883-84), £296; incidence of taxation, 9½d. per head. The water-supply is poor. Weekly market on Wednesdays, when cloth, cotton, oil, salt, and spices are sold.

Saunt Jot.—Village in Khága *tahsil*, Fatehpur District, North-Western Provinces; situated in lat. $25^{\circ} 50' 46''$ N., and long. $81^{\circ} 5' 9''$ E. Population (1881) 2216; prevailing caste, Chamars.

Sauráth.—Village in Darbhanga District, Bengal; 8 miles west of Madhubani. Famous for the large *melá* (religious fair) which takes

place annually in June or July, when vast numbers of Bráhmans assemble to settle their children's marriages. Sauráth contains a temple of Mahádeo, built about 1845 by the Darbhanga Rájá; close to this building is a tank, shaded by a fine mango grove.

Saúsar.—Southern *tahsil* or Sub-division of Chhindwára District, Central Provinces. Area 1088 square miles, with 407 towns and villages, and 22,668 houses. Population (1881) 110,809, namely, males 55,422, and females 55,387. Average density of the population, 102 persons per square mile. The male and female adult agriculturists number 46,029, or 41.54 per cent. of the total population; average area available for each adult cultivator, 9 acres. Of the total area of the *tahsil*, 344 square miles are held revenue-free, leaving 744 square miles for Government assessment, of which 373 square miles are cultivated, 75 square miles cultivable, and 296 square miles uncultivable waste. Amount of Government land revenue, including local rates and cesses levied on land, £10,830, or an average of 10½d. per cultivated acre, rental paid by cultivators, £16,180, or an average of 1s. 4½d. per cultivated acre. In 1884 the *tahsil* contained 1 criminal and 2 civil courts, with 2 police stations (*thánás*) and 5 outpost stations; strength of regular police, 83 men; *chaukidárs* or village watch, 392.

Saúsar.—Town and municipality in Chhindwára District, Central Provinces, and head-quarters of Saúsar *tahsil*, situated in lat. 21° 40' N., and long. 78° 50' E., 34 miles south of Chhindwára town, on the main road to Nágpur. Population (1881) 4311, chiefly agriculturists, namely, Hindus, 3747; Kabírpánthis, 174; Muhammadans, 275; Jains, 7; and non-Hindu aborigines, 108. Municipal income (1882-83), £119, of which £82 was derived from taxation, average incidence of taxation, 4½d. per head. Saúsar has a Government school, and a small fort; the proprietor is the representative of the Gond dynasty of Deogarh. *Sarát*, or native rest-house.

Sáváli.—Town in Baroda State (Gáekwár's territory), Bombay Presidency. Population (1881) 6275. Sáváli is the trade centre of a wide circle of villages. In the immediate neighbourhood are wide tanks, shady trees, and fruitful fields; at no great distance is the wild Mehwasí country of ravines and jungles bordering the Mahí. At one of the corners of the beautiful Sáváli tank stand two temples which commemorate the names of Damáji and his father Piláji. The treacherous murder, the invasion of Abhi Singh, the hasty funeral of the founder of the Gáekwár house, mark a crisis in the history of the Maráthá conquest, and give something of historic dignity to the unpretending temple of Piláji. Custom-house, post and police offices, and dispensary.

Savandrúg.—Hill fort in Bangalore District, Mysore State, locally known as the Magadi Hill, 4024 feet above sea-level. Lat. 12° 55' N., long 77° 21' E. It consists of an enormous mass of granite, standing

on a base 8 miles in circumference. The summit is divided by a chasm into two peaks—the *Kari* or black, and the *Bili* or white—each of which is abundantly supplied with water. The earliest fortifications are said to have been erected in 1543, by Sámanta Ráya, who gave the hill his own name of Sámanta-durga. The present appellation dates from the end of the 16th century, when Immadi Kempe Gauda of Bangalore established his stronghold here, in which his family maintained themselves until 1728. The fort was captured in that year by the Hindu Rájá of Mysore, from whom it passed into the hands of Haidar Alf. In 1791, Savandrúg was stormed by a British army commanded by Lord Cornwallis. On December 10, a force under Colonel Stuart encamped within 3 miles of the place; and after great difficulties in bringing up the battering train, the bombardment was opened on the 20th, and in three days the breach was declared practicable. The assault was delivered on the following day under the eyes of Lord Cornwallis. The whole line of fortifications was carried within an hour, without the loss of a single life on the British side.

Savanúr (*Sawanúr*).—Native State, situated within Dhárwár District, Bombay Presidency; lying between 14° 56' 45" and 15° 1' 45" N. lat., and between 75° 21' 45" and 75° 25' E. long. Area, 70 square miles. Population (1872) 17,288, (1881) 14,763, namely, males 7347, and females 7416, occupying 2646 houses, in 1 town and 23 villages. Hindus number 10,866, Muhammadans, 3859; and 'others,' 38. The principal products are cotton, *jór* (*Sorghum vulgare*), rice, *kulthi* (*Dolichos biflorus*), *múng* (*Phaseolus Mungo*), cocoa-nut, castor-oil, *tur* (*Cajanus indicus*), *pán* (*Piper Betle*), wheat, gram, plantains, and sugar-cane. Of the total area of 44,660 acres, 40,055 are cultivable, area under actual cultivation in 1883-84, 31,707 acres. Coarse cloths, such as *sarís*, *dholís*, etc., are manufactured to a small extent, and one loom for weaving silk cloths (*pitambar*) is worked. Some trade in grain. The betel-leaf grown in the Savanúr gardens is celebrated for its superior quality. Within the State there is only one forest, at Mulakari. Before Savanúr came under Tipú Sultán (1785), there was a mint at which gold coins were struck called Savanúr Huns, bearing the name of the reigning Nawáb and valued at 6s. 8d.

The reigning family are Muhammadans of Afghán descent. Abdúl Raúf Khan, the founder of the family, obtained in 1680 from the Emperor Aurangzeb the grant of the *jágir* of Bankápur, Torgal, and Azimnagar, with a command of 7000 horse. The family, though connected by marriage with Tipú Sultan, was entirely stripped of its possessions by him; and the Nawáb sought the protection of the Peshwá, from whom he received a pension of £4800 per annum. This was subsequently converted into a grant of territory, yielding an equal amount of revenue, through the intervention of General Wellesley.

The management of the State, which had since 1868 been under the care of the Collector of Dhárwār as Political Agent, was handed over in 1883 to Nawáb Abdúl Dalil Khán, a young man of great promise, who had been carefully educated at Rájáráam College, Kolhápúr. The young chief died in 1884. Strength of police, 66 men; cost of maintaining the force, £493. Criminal courts, 2; schools, 7. Average annual rainfall, 27·3 inches.

Savanúr.—Chief town of Savanúr State, Bombay Presidency. Lat. 14° 58' N., long. 75° 23' 5" E.; situated 40 miles south-east of Dhárwār. Population (1881) 7640, namely, Hindus, 4582; Muhammadans, 3031; and Jains, 27. The town is nearly circular, and covers an area of three-quarters of a square mile. It is enclosed by a ditch with eight gates, three of which are ruined. Between 1868 and 1876 the town was greatly improved, the roads widened and metalled, and many old wells and ponds repaired. Income of municipality in 1883-84, £629. Three schools with 218 pupils, of whom 60 were girls. Annual fair.

Savari (*Seberi, Severi*).—River in Madras Presidency. — See SABARI.

Sávda.—Sub-division of Khándesh District, Bombay Presidency. Area, 553 square miles. Population (1872) 124,519; (1881) 141,745, namely, males 71,720, and females 70,025, occupying 24,767 houses, in 4 towns and 178 villages. Hindus number 123,395; Muhammadans, 16,033; and 'others,' 2317. Sávda lies in the north-east of Khándesh District, and includes the petty divisions of Yával and Ráveri. The Sub-division is a well-wooded, unbroken plain, from which, along the north, the Sátpuras rise in a wall-like line. Though highly cultivated and thickly peopled, it is not on the whole well provided with water, excepting in the villages along the Tápti and the Súki. Despite extreme heat from March to June, the climate is healthy. The prevailing soil is a black alluvial clay from four to five feet deep, resting on a subsoil of soft yellowish clay (*mán*). This black soil is best in the centre, and grows poorer towards the river on the south and the hills on the north. In 1854-55, the year of settlement, 12,970 holdings or *khátís* were recorded with an average area of 16·3 acres, paying an average assessment of £1, 9s. 6d. In 1878-79, the area under actual cultivation was 217,874 acres. Cereals and millets occupied 125,846 acres; pulses, 11,902 acres; oil-seeds, 18,925 acres; fibres, 54,421 acres; and miscellaneous crops, 6780 acres. In 1883 the Sub-division contained 1 civil and 5 criminal courts; police circles (*thánds*), 3; regular police, 119 men; village watch (*chaukidárs*), 691. Land revenue, £30,844.

Sávda.—Chief town of the Sávda Sub-division of Khándesh District, Bombay Presidency, and a station on the Great Indian Peninsula Railway, 285 miles north-east of Bombay city; situated in lat. 21° 8' 30" N., and long. 75° 56' E. Population (1881) 8642, namely, Hindus,

7061; Muhammadans, 1324; Jains, 236; Christians, 6; Pársis, 2; and 'others,' 13. Sávda was finally ceded by the Nizám to the Peshwá in 1763, and was shortly afterwards bestowed on Sardár Ráste, whose daughter was given in marriage to the Peshwá. In 1852, in connection with the introduction of the revenue survey, a serious disturbance occurred at Sávda. From 10,000 to 15,000 malcontents gathered, and were not dispersed till a detachment of troops arrived and seized 59 of the ringleaders. A municipality has recently been established and had an income in 1883-84 of £233; incidence of taxation, 5½d. per head. Chief trade, cotton, gram, linseed, and wheat. Post-office; three schools. At the weekly market, valuable Nimár and Berar cattle are offered for sale.

Sávitri (Savatři).—River of Bombay Presidency, rising on the western declivity of the Mahábaleshwar range, Sátára District, in lat. 18° 28' N., and long. 73° 30' E. Descending the mountain side in a narrow rocky channel, it passes the towns of Mhar and Dásgáon through Southern Kolába, and reaches Ratnágiri District at Mahápral. After a total course of about 50 miles, it falls into the Arabian Sea at Bánkot in lat. 17° 58' N., and long. 73° 3' E. The mouth of the Sávitri is formed by bluff hills, jutting out on either side of the creek into the sea. Fort Victoria or Bánkot crowns the southern headland. Bánkot is only a fair-weather port. The passage is marked by buoys and beacons, but a rather formidable sand-bar, with a depth of 2½ fathoms at low water, lies across the entrance to the anchorage. The river is navigable, for native craft drawing 7 feet of water, 36 miles to the town of Mhar in Kolába District, for vessels of 16 feet, up to Mahápral in Ratnágiri, about 24 miles from the mouth. Between Bánkot and Mahápral there is no difficulty; large craft work up on a single tide. Between Mahápral and Mhar the river narrows, shoals and rocky ledges and reefs are numerous; and even for small craft, navigation is both difficult and dangerous. Every year within these limits the creek is silting and becoming more difficult. After the first two or three miles, the scenery of the creek is particularly striking. The hills rising boldly from the water's edge to a considerable height are, especially on the northern bank, clad with thick forests, which on some of the reaches surround the water on all sides, giving the creek the appearance of a mountain lake. Farther inland, the hills draw back, giving place to broad belts of lowland, divided from the water by mangrove swamps. Before Mhar is reached, the banks have become flat and uninteresting.

Sáwantwári.—Native State in Bombay Presidency, under the charge of a Political Superintendent, situated about 200 miles south of Bombay city, between 15° 38' 30" and 16° 14' N. lat., and between 73° 37' and 74° 23' E. long. Area, about 900 square miles. Population (1872) 190,814, and (1881) 174,433. The State is bounded on the

north and west by the British District of Ratnagiri, on the east by the Sahyádrí Hills, and on the south by the Portuguese territory of Goa. The general aspect of the country is strikingly picturesque. From the sea-coast to the foot of the Sahyádrí hills, a distance varying from 20 to 25 miles, are densely wooded hills, and in the valleys, gardens and groves of cocoa-nut and areca-nut palms. The chief streams are the Kárlí on the north, and the Terekhol on the south, which open out into creeks. Both are navigable for small native craft; the Terekhol for about 15, and the Kárlí for about 14 miles. The climate is humid and relaxing, with a heavy rainfall, averaging for the 32 years ending 1879, 143 inches, varying from 222 inches in 1874 to 93 inches in 1855. April is the hottest month in the year; but in May (though the temperature is slightly higher) a strong sea-breeze, the precursor of the south-west monsoon, tempers the heat.

The State is rich in forests of teak, especially near the Sahyádrí Hills, blackwood, *ain* (*Terminalia tomentosa*), *kher* (*Acacia Catechu*), *jámba* (*Nydia dolabriformis*). Nearer the sea, the more important trees are the jackwood, mango, and *bhurand* (*Garcinia indica*), whose fruit yields *kokam* oil. The principal fruits are mangoes and plantains, which are abundant and of excellent quality, citrons, limes, and jack fruit. Cocoa-nuts and cashew-nuts are very plentiful. The staple agricultural produce is rice; but the quantity grown is not sufficient for the wants of the people, and a good deal is imported. Excepting rice, none but the coarsest grains and pulses are raised. A species of oil-seed, *tíl* (*Sesamum indicum*), hemp, and black and red pepper, are also grown, but neither cotton nor tobacco. Both soil and climate are against the cultivation of wheat and other superior grains. For these, the people have to look to the country east of the Sahyádrí Hills, whence during the fair season, from October to June, large supplies come. Coffee has been grown with success, and it is believed that the spurs from the Sahyádrí range are suited to its cultivation on a large scale. Iron-ore of fair quality is found in the neighbourhood of the Rámghát, in the Sahyádrí range. The Akeri stone, a slate-coloured talc-schist, extremely hard, compact, and heavy, is unrivalled for building purposes. Laterite is quarried in many places. Talc of inferior quality is found at Kudáwal. The forests and wooded slopes of Sahyádrí hills contain large numbers of tigers, leopards, bison, *sámbhar* deer, etc. In 1883-84, locusts visited the State for the sixth successive year, but in smaller numbers than on previous occasions. About 12 millions of locusts were destroyed.

Population.—Population (1881) 174,433, namely, males 86,061, and females 88,372, occupying 30,444 houses, in 1 town and 225 villages. Hindus number 166,080; Muhamámadans, 3970; Christians, 4213; and 'others,' 170. The Christians are all Roman Catholics, and consist

of Indo-Portuguese and natives who have embraced Christianity. The common language of the people is a dialect of Maráthí, known as Kurauli. The sturdy and easily managed Maráthás and Mhars of this State are favourite recruits for the Bombay Native Infantry regiments. The inhabitants generally are poor, and are engaged chiefly in agriculture.

Manufactures.—Salt of an inferior kind was formerly manufactured, but the salt pans have recently been abolished. The principal industries of the State consist of gold and silver embroidery work on both leather and cloth; fans, baskets, and boxes of *khas-khas* grass, ornamented with gold thread and beetles' wings; lacquered toys, and playing cards; and elegant drawing-room ornaments carved from the horn of the buffalo and bison. Recently a pottery establishment for the manufacture of tiles has been opened. The pottery is now becoming widely known, and it is expected that a ready sale will be found for the tiles not required by the State.

Means of Communication.—There are no railways; but an excellent trunk road has recently been constructed from the seaport of Vengurla, which, passing through the State, leads by an easy gradient over the Sahyádrí Hills to Belgáum and the Southern Maráthá Country. The other chief lines of communication with the Deccan are the Rámghát, the Talkatghát, and the Phondághát.

Trade.—Within the limits of the State there is not much local trade; but during the fair season, a considerable quantity of cotton, hemp, and grain from the rich Districts of the Southern Maráthá Country passes coastwards, especially to the port of Vengurla. Compared with the exports, the imports at Vengurla are small.

History.—Early inscriptions show that from the 6th to the 8th centuries the Chálukyas ruled over Sāwantwāri. In the 10th century, the rulers were Yádavs. In the 13th century (1261), the Chálukyas were again in power. At the close of the 14th century (1391), Sāwantwāri was under an officer of the Vijayanagar dynasty. About the middle of the 15th century it formed part of a powerful Brahman dynasty. On the establishment of the Bijápur power at the close of the 15th century, Sāwantwāri became part of the territory of these kings. About three hundred years ago (1554), one Mang Sāwant of the Bhonsla family revolted from Bijápur, and making Hodwára, a small village 9 miles from Wári, his head-quarters, defeated the troops sent against him, and maintained his independence during his lifetime. After his death, his successors again became feudatories of the Bijápur kings.

The chief who finally freed his country from the Muhammadan yoke was Khem Sāwant Bhonsla, who ruled from 1627 to 1640. He was succeeded by his son, Som Sāwant, who, after ruling for

eighteen months, was succeeded by his brother Lakham Sāwant. When the power of Sivaji seemed in the ascendant (1650), Lakham Sāwant tendered him allegiance, and was confirmed as *Sar Desai* of the whole South Konkan. Dying in 1665, Lakham was succeeded by his brother Phond Sāwant, who, after ruling for ten years, was succeeded by his son, Khem Sāwant II. This chief was a contemporary of Sāhu, the grandson and second successor of Sivaji, who assigned to him, conjointly with the chief of Kolāba, half the revenue of the Sālsī Mahal. It was during the time of Khem's successor (1709-1737) that the Sāwantwāri State first entered into relations with the British Government. A treaty was concluded between them against the notorious piratical chieftain, Kanoji Angria of Kolāba.

The chief who ruled from 1755 to 1803, under the name of Khem Sāwant the Great, married in 1763 the daughter of Jājaji Sindhia; and consequently the title of Rāi Bahādur was conferred upon him by the Emperor of Delhi. The chieftain of Kolhāpur, envious of this honour, made a descent on Wāri, and captured several hill fortresses, which were, however, through Sindhia's influence, subsequently restored. The rule of Khem Sāwant, who, not content with wars on land, also took to piracy, was one long contest against Kolhāpur, the Peshwā, the Portuguese, and the British. Khem Sāwant died childless in 1803, and the contest for the succession was not decided till 1805, when Khem Sāwant's widow, Lakshmibāi, adopted a child, Rāmchandra Sāwant *alias* Bhāu Sāhib. This child lived for three years, and was then (1805) strangled in bed. Phond Sāwant, a minor, was chosen to fill his place. During these years of disorder the ports swarmed with pirates. So severely did British commerce suffer, that in 1812 Phond Sāwant was forced to enter into a treaty, ceding the port of Vengurla to the British, and engaging to give up all his vessels of war. Soon after the conclusion of this treaty, Phond Sāwant died, and was succeeded by his son, Khem Sāwant, a child of eight years. This chief, when he came of age, proved unable to manage his estate, and after several revolutions and much disturbance, at last in 1838 agreed to make over the administration to the British Government. After this rebellion twice broke out (in 1839 and 1844), but the disturbances were soon suppressed, and the country has since remained quiet.

The present (1884-85) chief is Sar Desai Raghunāth Rāo Sāwant Bhonsla, who is not yet considered fit to be entrusted with the duties of government. He has been educated at the Rāj Kumār College at Rājkot. He is entitled to a salute of 9 guns. He enjoys an estimated gross revenue of £32,500, and maintains a military force of 436 men, styled the Sāwantwāri Local Corps. The family of the chief

hold a title authorizing adoption, and in point of succession follow the rule of primogeniture. Strength of police, 155; cost in 1883-84, £2479. Daily average number of prisoners in jail, 51. Number of schools, 46; pupils, 2916.

Sáwantwári (*Wári* or *Sundarwári*, 'the Beautiful Garden').—Chief town of Sáwantwári Native State, Bombay Presidency.—*See* WARI.

Sawar.—Town in Ajmere District, Ajmere-Merwára, Rájputána. Lat. $25^{\circ} 49' N.$, long. $75^{\circ} 21' E.$ Distant 61 miles from Ajmere city. Chief town of Sawar *pargand*, and the residence of the *istimrardár*. Good water-supply. Post-office.

Sáyána.—Ancient town in Bulandshahr District, North-Western Provinces.—*See* SIYANA.

Sáyla.—Native State in the Jháláwár *prant* or division of Káthiáwár, Bombay Presidency. Area, 222 square miles, containing 37 villages. Population (1872) 16,528; (1881) 16,991. The climate is hot and dry, but healthy. Cotton is the chief produce; the usual grains are also grown. Dyeing is the only industry of consequence. The nearest port is Dholera. Sáyla ranks officially as a 'third-class' State in Káthiáwár; and the ruler executed the usual engagements in 1807. The present chief (1882-83), Thákur Wakhat Singhji, a Hindu of the Jhála Rájput caste, is thirty-eight years old, and administers his estate in person. He enjoys an estimated gross revenue of £7500, and pays a tribute of £1551, 2s. jointly to the British Government and the Nawáb of Junágarh. The family of the chief follow the rule of primogeniture in point of succession; no *sanad* authorizing adoption is held. Military force (1882-83), 296 men. Five schools, with a total of 336 pupils.

Sáyla.—Chief town of Sáyla State, Káthiáwár, Bombay Presidency; situated in lat. $22^{\circ} 32' N.$, and long. $71^{\circ} 32' E.$; 18 miles south-west of Wadhván, on the bank of a large tank called Mánasarowar, the excavation and building of which is popularly attributed to Sidhraj Jaiasingh, the celebrated sovereign of Anhilwára. Population (1881) 6488. Sáyla is famous for the temple of Rámchandra built by Lála Bhagat, a Baniyá saint who flourished in the beginning of the present century. Food is distributed daily to travellers, ascetics, and others. School, dispensary, and post-office.

Sayyidábad.—Eastern *tahsil* of Muttra (Mathura) District, North-Western Provinces; situated in the fertile Doáb portion of the District.—*See* SADABAD.

Sayyidnagar.—Old and decayed town in Jáláun District, North-Western Provinces. Distant from Urú 17 miles south-west, among the ravines of the Betwá. Population (1881) 3157. Large exports of cloth, dyed red and yellow; considerable manufacture and dyeing of cotton. Police station; school. A small house-tax is levied for police and conservancy purposes.

Sayyidpur.—Town in Fardpur District, Bengal, formerly on the Barisia river, but now two or three miles distant from the bank in lat. $23^{\circ} 25' 10''$ N., and long. $89^{\circ} 45'$ E. The town, which in 1876 contained an estimated population of 6324, mainly supported by river traffic, had in 1881 only 3269 inhabitants. There is still a considerable import trade in cotton, spices, iron, copper, brass, and bell-metal utensils; but the rising mart of Bealmar, $2\frac{1}{2}$ miles to the south and on the river bank, has attracted most of the business formerly carried on at Sayyidpur, which is now a decaying town. Fine *sitalpiti* mats are made in the neighbourhood. The town was formerly a municipality, now (1883) abolished.

Sayyidpur.—Western *tahsil* of Ghazipur District, North-Western Provinces, situated in the angle formed by the junction of the Gumti with the Ganges. The *tahsil*, which consists chiefly of low alluvial soil, comprises the three *parganas* of Sayyidpur-Bhitari, Baharabad, and Khanpur. Area, according to the latest official statement (1881), 249 square miles, of which 150 square miles were cultivated, 7 square miles cultivable, and 92 square miles uncultivable waste. Population (1881) 169,720, namely, males 85,603, and females 84,117; average density of population, 668 persons per square mile. Classified according to religion—Hindus, 157,173; Muhammadans, 12,529; and Christians, 13. Of the 554 villages comprising the *tahsil*, 448 contain less than five hundred inhabitants; 77 between five hundred and one thousand, and 29 between one and five thousand. Total Government land revenue, £22,616, or including local rates and cesses levied on land, £24,725. Rental paid by cultivators (including cesses), £39,341. In 1884, Sayyidpur Sub-division contained 1 civil and 2 criminal courts, with 2 police circles (*thanas*); strength of regular police, 27 men; rural police or village watch (*aisukidars*), 231.

Sayyidpur (Sayyidpur-Bhitari).—Village and ruins in Ghazipur District, North-Western Provinces, and head-quarters of Sayyidpur *tahsil*; lying in lat. $25^{\circ} 32' 5''$ N., and long. $83^{\circ} 15' 40''$ E., on the north bank of the Ganges, 20 miles west of Ghazipur town. Population (1881) 2905. Government charitable dispensary. Chiefly noticeable for its numerous remains of Hindu or Buddhist origin, including a flat-roofed, richly carved, massive stone building, besides several fragments and entire figures of ancient sculpture. At Bhitri, 5 miles north-east of the town, stands a sandstone monolith, 23 feet in height, of which 5 or 6 feet are buried beneath the ground. It bears an inscription recording the achievements of five kings of the Gupta dynasty. A ruined bridge of three arches, built by the Muhammadans out of stones from Hindu structures, spans the river Gangi. A small house-tax is raised for police and conservancy purposes.

Sayyidpur.—*Taluk* of Rohri Sub-division, now included in Ghotki

tiluk, Shikárpur District, Sind, Bombay Presidency. Area, 168 square miles. The Census Report of 1881 returned Sayyidpur separate from Ghotki. Population, 19,049, namely, males 10,185, and females 8864. Hindus number 2552; Muhammadans, 15,747; Sikhs, 481; and non-Hindu aborigines, 269.—For other information see GHOTKI.

Sayyid Sarawán.—Village in Chail *tahsil*, Allahabad District, North-Western Provinces, 15 miles west of Allahabad city, and 2 miles west of the Manauri station on the East Indian Railway, lat. $25^{\circ} 25' 48''$ N., long. $81^{\circ} 40' 34''$ E. Population (1881) 3066. The principal inhabitants are Shaikh *zamindars*. Good Anglo-vernacular school.

Sayyidwala.—Village and municipality in Gugaira *tahsil*, in Montgomery District, Punjab, and head-quarters of a police circle; situated in lat. $31^{\circ} 6'$ N., and long. $73^{\circ} 31'$ E., on the north bank of the Ravi, 20 miles north-east of Gugaira. Population (1881) 3389, namely, Muhammadans, 1940; Hindus, 1356; and Sikhs, 93. Number of houses, 654. Municipal income (1883-84), £183; average incidence, 1s. 1d. per head. The town, which is of purely local importance, is connected by road with Chiniot. It is a collection of brick and mud built houses, surrounded by a wall with four gates, with a single well-paved street for a *bidar*; police station, school-house, and municipal committee house.

Sealkote.—District, *tahsil*, and town in the Punjab.—See SIALKOT.

Seberi (*Severi*).—River in Madras Presidency.—See SABARI.

Secunderábád.—*Tahsil* and town in Bulandshahr District, North-Western Provinces.—See SIKANDARABAD.

Secunderábád (*Sikandarábád*, or 'Alexander's Town')—British military cantonment in the Native State of Haidarábád or the Nizám's Dominions; situated 6 miles north-east of Haidarábád city, in lat. $17^{\circ} 26' 30''$ N., and long. $78^{\circ} 33'$ E., at an elevation of 1830 feet above sea-level. Population (1881) 74,124. Secunderábád cantonment, named after Nizám Sikandar Jah, is the largest military station in India, and forms the head-quarters of the Haidarábád Subsidiary Force, which constitutes a Division of the Madras army. The military force stationed here in September 1885 consisted of one regiment of Europeans and another of Native Cavalry, one battery of Royal Horse Artillery, three batteries of Royal Artillery (field and garrison), two regiments of British and four of Native Infantry, with two companies of *Sappers and Miners*. An Ordnance Establishment has charge of the Arsenal, and there is also a large Commissariat Staff. This force is maintained by the British Government, under the terms of a treaty with the Nizám dated 21st May 1853, in lieu of certain contingent contributions which had been previously raised by the Nizám to employ in the British army, but had proved inefficient. The cost of the force is

defrayed out of the revenues of certain Districts ceded by the Nizám under the treaty of May 1853, revised by a second treaty in 1860. (See HAIDARABAD STATE.)

Up to the year 1850, the cantonment of Secunderábád consisted of a line of barracks and huts, extending to a distance of 3 miles from east to west, with the artillery in the front and on the left flank, and the infantry on the right. Since that date, however, the cantonment boundaries have been extended as far as BOLARAM, covering a total area of 19 square miles, including many interspersed villages. New double-storied barracks have been erected for the European soldiers; and the quarters for the Native troops, which are situated at some distance, are also comfortably built.

The country for miles around undulates into hummocks, with outcrops of underlying rock, crossed from east to west by greenstone dikes. East of the cantonment are two large outbursts of granite; in the north-east is a granite hill known as Múl Alf, and near it another called Kadam Rasúl, from a legend that it bears an impress of Muhammad's foot. Shady trees line the roads of the cantonment, and near the European barracks and Native lines are clusters of date and palmyra palms. Otherwise the face of the country is bare, with but little depth of soil in the elevated parts. Cultivation is carried on in the dips and valleys, in several of which tanks have been constructed. The water-supply from wells is not abundant. Immediately to the south-west of the cantonment is a large artificial reservoir or tank, known as the Husain Ságar, about 3 miles in circumference.

The parade-ground is of great extent, upon which a force of seven or eight thousand troops can be manœuvred with ease. To the right are the public rooms. Close by is the cemetery. A little to the left of the rooms is the mud fort or battery containing some heavy pieces of ordnance. A detachment of artillery is stationed in the fort. A short distance from Secunderábád is the cantonment of Trimalgiri, containing an entrenched camp capable of accommodating all the Europeans in the neighbourhood.

The Haidarábád Subsidiary Force is not the sole military body in the neighbourhood. Adjoining the Secunderábád cantonment to the north is the Boláram cantonment, one of the stations of the Haidarábád Contingent under the immediate authority of the Nizám. The force stationed here consists of one regiment of cavalry, one of infantry, and a battery of artillery. Again, about 5 miles south of Secunderábád cantonment, are the lines of the Haidarábád Reformed Troops, also belonging to the Nizám, comprising artillery, cavalry, and infantry, under the command of a European officer. Altogether, within a space of 10 miles from north to south, about 8000 disciplined soldiers are cantoned.

Begampett and Bauempilli are a short distance west of Secunderabad. The pioneers are stationed at the first place, and a Madras cavalry regiment at the latter. During the Mutiny of 1857, an unsuccessful attempt was made to tamper with the fidelity of the troops at Secunderabad. An attack on the British Residency was repulsed; and during the troubled times of 1857-58 much good service was rendered by both the Subsidiary Force and the Haidarabad Contingent.

In the rainy season, especially towards its close, the climate of Secunderabad is unhealthy, both for Europeans and natives. The rainfall varies greatly; during the thirty-nine years ending 1881 it averaged 27.7 inches. The prevalent diseases are fevers, dysentery, and rheumatism.

Sebsaugor.—District, Sub-division, and town in Assam.—*See* SIBSAGAR.

Segauli.—Town in Champaran District, Bengal; situated 15 miles from Motihari, on the Bettia road, in lat. $26^{\circ} 46' 41''$ N., and long. $84^{\circ} 47' 51''$ E. A military station, ordinarily occupied by a regiment of Native cavalry. An embankment protects the cantonment from inundation by the Sikkhená river, which flows a little distance to the north. In 1857, the main body of the 12th Regiment of Irregular Horse stationed here broke into open mutiny, and murdered their commanding officer; though a detachment did good service during the subsequent operations in Oudh.—(*See* Sir J. W. Kaye's *History of the Sepoy War*, vol. iii. pp. 102-107.)

Seghúr (Sígúr) Ghát.—Mountain pass in the Nilgiri Hills District, Madras Presidency, running down the north face of the hills from Mutinád to near the village of Seghúr. Lat. $11^{\circ} 29'$ to $11^{\circ} 31' 40''$ N., and long. $76^{\circ} 43' 30''$ to $76^{\circ} 43' 35''$ E. The head of the pass is distant from Utakamand nearly five miles. The descent from the crest is about seven miles in length, but a little more than eight miles to the old bungalow at Seghúr. About half-way down is the village of Kalhatti, with its picturesque waterfall (170 feet) not far below. The pass, being practicable for laden carts and other wheeled conveyances, was the most frequented of all the Nilgiri gháts. At one time it was the favourite approach to the hills by the visitors from the northern parts of the Presidency and Madras. 'By this pass,' says Pharoah, 'communication is kept up with Bangalore, Madras, and all places to the northward; and the chief bulk of European supplies, heavy baggage, horse gram, rice, etc., comes to the settlement by it. It also affords the means of transit for the teak timber used on the hills in the form of rafters, planks, etc.; the road passes near the forests where the trees are cut.' The corrected spelling is Sígúr.

Sehi.—Village in Chhátá *tahsil*, Muttra (Mathurá) District, North-Western Provinces; situated in lat. $27^{\circ} 40' 2''$ N., and long. $77^{\circ} 41' 13''$ E.,

8 miles south-east of Chhāta, and 16 miles north of Muttra city. Population (1881) 2211. Two annual fairs are held here. The village is the property of the high priest of the great temple at Brindāban.

Sehorá.—Village in Tirorā *tahsil*, Bhandará District, Central Provinces. Population (1881) 2539, namely, Hindus, 2268; Muhammadans, 196; Jains, 5; and non-Hindu aborigines, 70.

Sehore.—Town in Bhopál State, Central India Agency; situated on the right bank of the Saven, in lat. $23^{\circ} 11' 55''$ N., and long. $77^{\circ} 7' 14''$ E., on the route from Sagar (Saugor) to Asírgarh, 132 miles south-west of the former place, and 152 north-east of the latter; distant from Bhopál city 22 miles south-west, and 90 miles from Mhow and Indore; from the latter place a good road is being constructed *via* Dewás and Sonkach. Sehore is the head-quarters of the Bhopál Political Agency and of the Bhopál Battalion, a local corps under the orders of the Government of India. Population (1881) of the town, 5206, namely, Hindus, 3000; Muhammadans, 2045; and 'others,' 161. Of the cantonment, 10,389, namely, males 5666, and females 4723. Hindus number 8055; Muhammadans, 2288; and 'others,' 46. Manufacture of printed muslins. Good *bázár*.

Sehwán.—Sub-division of Karáchi (Kurrachee) District, Sind, Bombay Presidency; lying between $25^{\circ} 13'$ and $26^{\circ} 56'$ N. lat., and between $67^{\circ} 10'$ and $68^{\circ} 29'$ E. long. Area, 5759 square miles. Population (1872) 162,836; (1881) 176,917. Bounded north by Mehar, a Sub-division of Shukárpur; east by the Indus; south by the Jerruck (Jhirak) Sub-division of Karáchi (Kurrachee) District; and west by the Khirthar and Pab Mountains. The administrative head-quarters are at KOIRI TOWN.

The Sub-division of Sehwan differs from the rest of Sind in being more hilly. It contains the only large lake in the Province, viz. the MANCHHAR, which, when fed by the waters of the Indus during the months of flood, attains a length of 20 miles and a breadth of 10 miles, covering a total area estimated at 180 square miles. The chief hills are the LAKI range, an offshoot from the Kirthar mountains; and the Jatil Hills. There are 37 Government canals in Sehwan, the principal being the WESTERN NARA, the ARAL, the PHITO, and the KARO. The Sub-division contains several hot springs. Game and fish of all kinds are abundant. The Government forests cover an area of 24,474 acres, and yielded in 1873-74 a revenue of £3185. The population of Sehwan in 1881 numbered 176,917, namely, males 96,426, and females 80,491, occupying 32,897 houses, in 6 towns and 210 villages. Hindus number 19,292; Muhammadans, 151,266; Sikhs, 5779; Christians, 465; non-Hindu aborigines, 87; Pársis, 21; Brahmos, 4; Jews, 3. The principal antiquities are the forts of SEHWAN and Ranf-ka-kot. (See SANN.)

Agriculture.—The Dádú and Sehván *táluks* contain perhaps the finest wheat lands in the whole of Sind. Much cultivation is carried on in the neighbourhood of the Manchhar Lake, after the subsidence of the annual inundation. The principal crops are wheat, *joír* (*Sorghum vulgare*), cotton, barley, pulse, oil-seeds, and vegetables. The prevailing tenure is *samíndári*; about one-twelfth of the whole area is held in *jágír*, or revenue-free. In 1882-83, the area assessed to land revenue was 205,392 acres; the area under actual cultivation being 189,200 acres. A large transit trade is carried on in wool, cotton, dried fruits, etc. (*See KARACHI TOWN.*) The local traffic consists of fish, mats, cloths, oil, *ghí*, and grain. The principal manufactures comprise carpets, coarse cotton cloth, rugs, and mats. The aggregate length of roads in the Sub-division is about 450 miles; and the Sind, Punjab, and Delhi (Indus Valley State) Railway passes through its entire length. The number of ferries is 20, nearly all of which are on the Indus.

Administration.—The total revenue of Sehván Sub-division in 1881-82 amounted to £62,871, of which £58,244 was derived from imperial and £4627 from local sources. The land-tax, *abkári* (excise), and stamp duties formed the main items. Two subordinate civil courts, at Sehván and Kotri. Criminal courts, 12; police circles (*thánds*), 39. Total number of police, 360, or 1 constable to every 491 of the population. Number of municipalities, 6, namely, Kotri, Sehván, Johi, Bubak, Dádú, and Mánjhand. Aggregate municipal income (1883-84), £3039; incidence of taxation varying from 1s. 0½d. to 2s. 7½d. Subsidiary jails at Kohistán and Kotri. Number of Government schools (1873-74), 22, with 972 pupils.

Climate.—Average annual rainfall for 17 years ending 1881 registered at Sehván, 7·51 inches. Prevalent diseases, fevers and cholera. Hospital at Kotri, dispensary at Sehván.

Sehván.—*Táluk* in Sehván Sub-division, Karáchi (Kurrachee) District, Sind, Bombay Presidency. Area, 923 square miles. Population (1872) 54,292; (1881) 54,327, namely, males 29,082, and females 25,245, occupying 10,648 houses, in 2 towns and 74 villages. Hindus number 6762; Muhammadans, 46,186; Sikhs, 1324; Christians, 38; non-Hindu aborigines, 9, Parsís, 4; and Brahmos, 4. Area assessed to land revenue (1882-83), 75,598 acres, area under actual cultivation, 65,601 acres. The *táluk* contained in 1883, 1 civil and 2 criminal courts; police circles (*thánds*), 9; regular police, 122 men. Revenue, £12,232.

Sehván.—Chief town of Sehván *táluk*, Karáchi (Kurrachee) District, Sind, Bombay Presidency; situated in lat. 26° 26' N., and long. 67° 54' E., on the main road from Kotri to Shikárpur *via* Lárkhina, 84 miles north-north-west of Kotri, and 95 miles south-south-west of

Lárhána; elevation above sea-level, 117 feet. The river Indus, which formerly flowed close to the town, has now quite deserted it. A few miles south of Schwán, the Laki Hills terminate abruptly, forming a characteristic feature of this portion of the Sub-division. Schwán is the head-quarters of a *mukhtidár* and *táppádar*. A station on the Sind, Punjab, and Delhi (Indus Valley State) Railway, with a branch line from the station to the town. Population (1881) 4524. The Muhammadan inhabitants are for the most part engaged in fishing; the Hindus, in trade.

A large section of the people are professional mendicants, supported by the offerings of pilgrims at the shrine of Lál Sháhábá. The tomb containing the remains of this saint is enclosed in a quadrangular edifice, covered with a dome and lantern, said to have been built in 1356 A.D., and having beautiful encaustic tiles with Arabic inscriptions. Mírzá Jání, of the Tarkhan dynasty, built a still larger tomb to this saint, which was completed in 1639 A.D. The gate and balustrade are said to have been of hammered silver, the gift of Mír Karam Alí Khán Talpur, who also crowned the domes with silver spires. The chief object, however, of antiquarian interest in Schwán is the fort, ascribed to Alexander the Great. This is an artificial mound 80 or 90 yards high, measuring round the summit 1500 by 800 feet, and surrounded by a broken wall. The mound is evidently an artificial structure, and the remains of several towers are visible. The fortifications are now in disrepair. Schwán is undoubtedly a place of great antiquity. Tradition asserts that the town was in existence at the time of the first Muhammadan invasion of Sind by Muhammad Kásim Sáfíki, about 713 A.D.; and it is believed to be the same place which submitted to his arms after the conquest of Nerankot, the modern Haidarábád.

The public buildings of Schwán are the Subordinate Civil Court, Government Anglo-vernacular school, dispensary, post-office, lock-up, Deputy Collector's and travellers' bungalow, and *dharmaśāla*. Municipal income in 1883-84, £690; incidence of taxation, 2s. 7½d. per head. The transit trade is mainly in wheat and rice; and the local commerce, in cloth and grain. The manufactures comprise carpets, coarse cloth, and pottery. The art of seal-engraving, which was formerly much practised, is now almost extinct.

Sejakpur.—Petty State in the Jháláwár *prant* or Division of Káthiáwár, Bombay Presidency; consisting of 4 villages, with 3 shareholders or tribute-payers. Area, 29 square miles. Population (1881) 1731. Estimated revenue, £532; of which £31, 13s. is paid as tribute to the British Government, and £11, 12s. to the Nawáb of Junágarh.

Selam.—District and town in Madras Presidency.—See SALEM.

Selere.—River in Vizagapatam District, Madras Presidency.—See SILLER.

Selu (*Sailu*).—Town in Wardhá *tahsil*, Wardhá District, Central Provinces; situated in lat. 20° 50' N., and long. 78° 46' E., on the Bor river, 11 miles north-east of Wardhá town, and close to the old high-road from Nágpur to Bombay. Population (1881) 2918, namely, Hindus, 2715; Kabírpánthís, 27; Muhammadans, 165; and non-Hindu aborigines, 11. Selu was an old Gond settlement; but the fort was built by a chief named Kandeli Sardár. It was the scene of a skirmish between Hazárf Bhonsla and the Pindáris. Chief manufacture, cotton cloth; in which, as well as in raw cotton, much business takes place at the market held every Tuesday. *Sardí* (native inn), police outpost, and vernacular school.

Sendamangalam.—Town in Salem District, Madras Presidency.—*See* SHENDAMANGALAM.

Sendgarsa.—High table-land in the Santál Parganá District, Bengal, overlooking the great central valley of the Rájmahál hills. Height, about 2000 feet.

Sendúrjana.—Town in Amráoti District, Berar, about 60 miles north-east of Ellichpur. Population (1881) 8501, namely, Hindus, 7546; Muhammadans, 782; Jains, 166; and 'others,' 7. A very fine well, which was built by a former *jágírdár*, and is said to have cost £2000, is about a mile distant. The principal trade of the large market held on Fridays is in turmeric, cotton, and opium. Government school and police outpost.

Senháti.—Town in Khulná District, Bengal, 4 miles north of Khulná; contains the largest collection of houses in the District, and perhaps the most jungly place in it. Population above 2000, but not returned separately in the Census Report of 1881. The numerous tanks scattered over the town are filled with weeds and mud; and the roads, with one exception, wind through tangles of brushwood. Market-place, called Nimái Ráu's *bázár*, with a temple to Kálí; one or two sugar refineries, the produce of which is exported chiefly to Calcutta. On the banks of the river Bhairab are two shrines—one dedicated to Sítalá, goddess of small-pox, and the other to Jwárnáráyan, god of fever.

Sentapilli (*Santapilly*).—Village and lighthouse in Vizagapatam District, Madras Presidency.—*See* CHANTAPILLI.

Seodivadar.—Petty State in the Gohelwár *prant* or Division of Káthiáwár, Bombay Presidency; consisting of 1 village, with 1 shareholder or tribute-payer. Area, 1 square mile. Population (1881) 246. Estimated revenue, £97; of which £5, 4s. is paid as tribute to the Gáekwár of Baroda, and 16s. to the Nawáb of Junágarh.

Seonáth (or *Seo*).—River rising in lat. 20° 30' N., long. 80° 43' E., in the Pánábáras Chiefship, in Chándá District, Central Provinces. After leaving a hilly tract, it flows through Nándgion State and the richer parts of Ráipur District; then turning to the east, it forms for

some distance the boundary between Raipur and Biláspur; and finally joins the Mahánadí at Devighát. Its chief affluents are the Agar, Hámp, Maniári, Arpá, Kárún, and Lílágar.

Seondará.—Village in Bilári *tahsil*, Moradábád District, North-Western Provinces; situated in lat. $28^{\circ} 33' 45''$ N., and long. $78^{\circ} 54' 30''$ E. Population (1881) 3724. Bi-weekly market held on Thursdays and Sundays. Police station, school, and *sarái* or native inn.

Seonhra.—Town in Datia State of Bundelkhand, Central India Agency.—See SEORHA.

Seoní (Seonee).—A British District in the Chief Commissionership of the Central Provinces, lying between $21^{\circ} 36'$ and $22^{\circ} 58'$ N. lat., and between $79^{\circ} 14'$ and $80^{\circ} 19'$ E. long. Bounded on the north by Jabalpur, on the east by Mandlá and Bálághát, on the south by Bálághát, Nágpur, and Bhandará, and on the west by Narsinghpur and Chhindwára. Area, 3247 square miles. Population (1881) 334,733 souls. The administrative head-quarters are at SEONI TOWN.

Physical Aspects.—The District of Seoní occupies a portion of the Sát-pura table-land, which separates the valley of the Narbadá (Nerbudda), on the north, from the great plain of Nágpur, on the south. The greater part of the District consists of the plateaux of Lakhnádon and Seoní on the north and west, together with the valleys between; and of the watershed and elevated basin of the Waingangá river on the east. Almost everywhere the scenery presents the varied aspect of an upland country. Geologically, northern Seoní constitutes a part of the wide field of overflowing trap which occupies the area between the Pachmarhí hills westward and the Maikal range beyond Mandlá to the east. In the south, the formation consists of crystalline rock. Towards the western boundary, the metamorphic rocks, chiefly gneiss and micaceous schist, form the southern face of the hills which bound the Seoní plateau: Northwards, they are lost sight of in the bed of laterite which overlies this part of the plateau, and covers the trap to within a short distance of Seoní town. A few miles east of Seoní, the crystalline rocks again come to the surface; and from this point eastward, the valley of the Sagar constitutes the line of demarcation between the crystalline rocks and the trap.

The District is hilly throughout, but the physical features of the geological formations present a marked contrast. In the north the trap hills either take the shape of ridges with straight outlines and flattened tops, or, rising more gradually, expand into wide undulating plateaux. The valleys are wide and bare, and contain the rich black soil formed by disintegrated trap, spread over a deep deposit of calcareous clay; while the intersecting streams, as they cut through the clay, expose broad masses of bare black basalt, alternating with marshy and stagnant pools. In the southern portion of the District, the hills are more

pointed, the valleys more confined, and the soil, even where it is rich, contains a large admixture of sand. Seoni must at one time have abounded with timber. At present the northern hills have much teak, but of an inferior and stunted growth. Along the Waingangá a few patches of young teak are found; the vast bamboo forest of Sonáwání, in the south-east corner of the District, contains fine *bíse-sál* and *tendú*; while to the north some large *sáj* grows upon the hills. The reserved forests consist of the great firewood reserve for Kámthi and Nágpur, covering 315 square miles.

The chief river of the District is the Waingangá, which rises a few miles east of the Nágpur and Jabalpur road, near the Kurái Ghát; and soon afterwards, turning to the south, forms the boundary between Seoni and Bálághát Districts. Its affluents are the Hiri and Ságar on the right bank; the Thell, Bijná, and Thánwar on the left. Besides these streams, the Timar and the Sher flow northwards to the Narbadá; and on the west, the Pench for some distance separates Seoni from Chhindwára. The Nágpur and Jabalpur road crosses the Sher at Sonái Dongri, where a fine stone bridge spans the river. The general slope of the country is from east to west. The elevation of the Seoni and Jakhnádón plateaux varies from 1800 to 2200 feet above sea-level.

Iron is found at several places in Seoni District, but is only worked at Jutáma near Pipáwání, as since the introduction of the system of Forest Conservancy, charcoal cannot be obtained at a sufficiently low rate. Gold is found in many of the smaller streams and their affluents, and is occasionally washed for by an aboriginal tribe called Mundiás, or locally in Seoni District, Songriás.

History.—About the 5th century of our era, a dynasty of conquerors appears to have reigned on the Sátapura table-land. Some grants of territory inscribed on copper plates found in Seoni, an inscription in the Zodiac cave at Ajantá, and a few passages in the *Puránas*, dimly disclose a line of princes sprung from one Vindhya-sakti. This mythical hero seems to be the eponymous monarch of the Vindhyan Hills, in which designation the *Puránas* include the Sátapura range. But the history proper of Seoni begins with the reign of Rájá Sangrám Sá of Garha-Mandlá, who, in 1530, extended his dominion over fifty-two chiefships, three of which—Ghansor, Chauri, and Dongartal—form the greater part of the present District. Nearly two centuries later, Narendra Sá, the Rájá of Mandlá, conferred these tracts on Bakht Buland, the famous prince of Deogarh, in acknowledgment of his assistance in suppressing a revolt. Bakht Buland placed his kinsman Rájá Rám Singh in possession of the Seoni country; and the latter built a fort at Chhapárá and established his headquarters in that town. Soon afterwards, Bakht Buland made a progress through the District, and chanced to make the acquaintance of Táj

Khán, a Muhammadan adventurer. The bravery of Táj Khán in killing a bear single-handed first attracted the attention and won the favour of the Deogarh monarch; and it was at the instigation, and in the name of Bakht Buland, that Táj Khán attacked and took Sângarhí in Bhandára District.

In 1743, Raghuji, the Maráthá Rájá of Nágpur, finally overthrew the dynasty of Deogarh; but Muhammad Khán, who had succeeded his father, Táj Khán, at Sângarhí, refused to recognise the conqueror, and held out against the Maráthás for three years. Admiring his conduct, Raghuji offered him Seoni District if he would give up Sângarhí. Muhammad Khán consented; and repaired to Chhapará, whence he governed Seoni, with the title of Díván. One serious reverse chequered a fortunate and successful reign when, during the absence of Muhammad Khán at Nágpur, the Rájá of Mandlá attacked and captured Chhapará. The square tomb which still stands in the ruined fort covers the large pit in which all those slain in the assault were buried. The Díván, however, speedily advanced from Nágpur with a large force, and recovered his capital; and the Thánwar and Gangá rivers were again declared to be the boundaries between Seoni and the Mandlá kingdom.

Majíd Khán, the eldest son of Muhammad Khán, succeeded in 1761; and was followed in 1774 by his son Muhammad Amín Khán, who removed his head-quarters to Seoni, where he built the present family residence. After a prosperous reign of twenty-four years, he was succeeded by his eldest son, Muhammad Zamán Khán. The weakness of the new ruler proved disastrous both to the country and the dynasty. Chhapará, which, though no longer the capital, was still a large and flourishing city, with a population, it is said, of 40,000, was sacked and utterly ruined by the Pindáris; and soon afterwards, perceiving the incompetence of the Díván, and anxious to compensate by fresh acquisitions for their cession of Berar to the British in 1804, the Maráthás ejected Muhammad Zamán Khán. Raghuji then sold the government of the District for £30,000 per annum to Kharak Bhártí, a Gosáin. Eventually, with the downfall of the Nágpur power, Seoni came under British rule, and since then has remained undisturbed. The District contains but few architectural remains. At Umargarh, Bhainságarh, Partápgarh, and Kanhágarh, all situated on commanding spots along the southern margin of the Sátpuras, stand ruined forts attributed by tradition to the Bundelá Rájás. Of these, the Bhainságarh fort is in the least imperfect condition. Two old Gond forts also remain,—one in the Sonwára forest, near Ashta; the other near Ugh, on a well-nigh inaccessible rock in the bed of the Hiri river. At Ghansor, 20 miles north-east of Seoni town, the ruins of about 40 temples seem to indicate the former existence of a large town. Some

of the plinths are still in their place, and are attributed to a caste of Hindus from the Deccan called Hemárpánthís.

Population.—A rough enumeration in 1866 returned the population of Seoni at 421,750, but on a much larger area than the present District. The Census of 1872 disclosed a population, in the District as at present constituted, of 300,558. The last Census in 1881 returned a total of 334,733 inhabitants, showing an increase of 34,175, or 11·37 per cent., in nine years, of which 9·6 per cent. represents the natural increase of registered births over registered deaths, and the remainder the gain by immigration from neighbouring Districts.

The results of the Census of 1881 may be summarized as follows:—Area of District, 3247 square miles, with 1 town and 1462 villages. Number of houses, 72,349, namely, 67,104 occupied, and 5245 unoccupied. Total population, 334,733, namely, males 167,925, and females 166,808. Average density of population, 103·1 persons per square mile. Villages per square mile, 0·45; persons per village, 229; houses per square mile, 20·67; persons per occupied house, 5. Classified according to sex and age, the Census returns—under 15 years, males 72,384, and females 69,430; total children, 141,814, or 42·4 per cent. of the population: 15 years and upwards, males 95,541, and females 97,378; total adults, 192,919, or 57·6 per cent.

Religion.—Hindus number 179,705, or 53·7 per cent. of the population; Muhammadans, 13,442, or 4 per cent.; Jains, 1408; Kabírpánthís, 598; Satnámis, 9, Sikhs, 25, Christians, 99; Pársís, 3; and non-Hindu aboriginal tribes, 139,444, or 41·7 per cent. The total number of aboriginal tribes, Hindu and non-Hindu, was returned at 145,995, of whom 145,014 were Gonds.

Among the higher Hindu castes, Bráhmans number 6160; Rájputs, 8958; Baniyás, 2600; and Káyasths, 1324. The lower or Súdra castes include the following:—Ahr, the most numerous caste in the District, 26,674; Mehrá, 17,919; Ponwár, 15,071; Marár, 9746; Katiyá, 7448; Kurmí, 7303; Telí, 6140; Gawárf, 5161; Lohár, 4817; Dhímár, 4815; Lodhí, 4209; Kallár, 4065; Chamár, 3849; Náí, 3633; Kírár, 2746; Sonár, 2525; Dhobí, 2512; Banjára, 2111; and Kachhí, 1806. The Muhammadan population are divided according to sect into—Sunnís, 12,612; Shiás, 333; Wahábís, 36; and unspecified, 461. The Christian population comprises—Europeans, 15; Eurasians, 7; Indo-Portuguese, 3; and Natives, 74.

Urban and Rural Population.—Seoni town, with a population (1881) of 10,203, is the only place in the District with upwards of five thousand inhabitants, and is the sole municipality. Of the 1462 villages, 866 contain less than two hundred inhabitants; 495 between two and five hundred; 89 between five hundred and a thousand; and 12 between one thousand and three thousand. As regards occupation,

the Census divides the male population into the following six classes:—(1) Professional class, including civil and military, 7320; (2) domestic class, 1009; (3) commercial class, including merchants, traders, carriers, etc., 1830; (4) agricultural and pastoral class, including gardeners, 83,536; (5) manufacturing and industrial class, including artisans, 17,378; (6) indefinite and non-productive class, comprising general labourers and male children, 60,452.

Agriculture.—Of the total area of 3247 square miles, only 1098 square miles were cultivated in 1883–84; and of the portion lying waste, 613 square miles were returned as cultivable, and 1536 square miles as uncultivable waste. The total area assessed for Government revenue is 2276 square miles, of which 984 square miles are cultivated, 596 square miles are cultivable, and 696 square miles are uncultivable waste. Wheat forms the chief crop of the District, and is grown year after year on the rich black soil of the plateaux in the north and west. In 1883–84, it occupied 265,913 acres; while 388,217 acres were devoted to other food-grains. The rice land of the District lies in the south. In 1883, rice was grown on 169,185 acres. Other products were—sugar-cane, 778 acres; cotton, 6594 acres; and other fibres, 2214 acres. The *kása* grass, which yields an oil like the *cajepát*, and the *baherá* (*Terminalia bellerica*), *harrá* (*Terminalia chebula*), and *manjít* (*Rubia munjeesta*), plants which supply valuable dyes, abound in the District. The average out-turn per acre in 1883 is returned as follows:—Wheat, 744 lbs.; inferior grains, 865 lbs.; rice, 555 lbs.; sugar, 1040 lbs.; cotton, 52 lbs.; oil-seeds, 147 lbs. The agricultural stock and implements in 1883–84 were thus returned—Cows, bullocks, and buffaloes, 279,735; horses, 297; ponies, 7032; donkeys, 306; sheep and goats, 22,183; pigs, 12,823; carts, 9611; and ploughs, 32,315.

Of the total male and female agricultural population in 1881, landed proprietors were returned as numbering 2894; tenants with occupancy rights, 21,767; tenants-at-will, 46,602; assistants in home cultivation, 13,879; and agricultural labourers, 50,710. Estate agents, farm-bailiffs, shepherds, herdsmen, etc., bring up the total agricultural population to 141,944, or 42.4 per cent. of the District population; average area of cultivated and cultivable land per head, 8 acres. The rent rates per acre in 1883 for the different qualities of land are returned as follows:—Land suited for wheat, 2s. 7½d.; inferior grains, 1s. 7½d.; rice, 2s. 3d.; cotton, 1s. 11½d.; sugar-cane, 4s. 3d.; cotton, 3s. 10½d. Total amount of Government assessment, including local rates and cesses levied on the land, £16,336, or 6½d. per cultivated acre. Total rental paid by cultivators, £48,012, or 1s. 6d. per cultivated acre. The ordinary prices of produce per cwt. were as follows:—Wheat, 4s. 1d.; rice, 6s. 10d.; sugar (*gír*), 12s. 3d.; cotton

(cleaned), 45s. 6d. Wages averaged, for skilled labour, 1s.; for unskilled labour, 3³d. per diem.

Commerce and Trade.—The trade of the District is chiefly carried on by means of markets in the towns. The most important are those held at Burghát, Koráí, and Piparwáni, to which the grain of the rice-producing tract in the south is brought for export to Nágpur and Kámthi (Kamptee). Three annual fairs take place in the District—namely, at Mundára, close to Seoní town at the source of the Waingangá, at Suráikha at the junction of the Híri and Waingangá, and at Chhapará. The first two are primarily religious gatherings, but a large business is done in general merchandise, by traders from Seoní, Mandlá, Jabalpur, and Nágpur. The last is a cattle fair, at which some 70,000 head of cattle change hands annually. The imports and exports are both insignificant, but the through traffic between Nágpur and Bhandára and the north causes some degree of business. The manufactures consist of coarse cloth, and some pottery of superior quality made at Kánhsvárá. At Khawása, in the midst of the forest, leather is beautifully tanned. The chief line of communication is the high-road from Nágpur to Jabalpur, which enters the District near Khawása, and, passing by Seoní town, crosses the border into Jabalpur District near Dhúmá. It has travellers' bungalows at Kuráí, Chhapará, and Dhúmá. A District road with American platform bridges runs from Seoní through Katangi, to join the Great Eastern Road. The other lines consist of mere bullock tracks, leading to various points in Bálághát and Nágpur Districts. Seoní has no means of communication by water or by rail.

Administration.—In 1861, Seoní was formed into a separate District of the British Government of the Central Provinces. It is administered by a Deputy Commissioner, with Assistants and *tahsildárs*. Total revenue in 1876–77, £25,567; and in 1883–84, £35,419, of which £15,379 was derived from the land-tax. Total cost of District officials and police of all kinds (1883–84), £7547. Number of civil and revenue judges of all sorts within the District, 6; magistrates, 5. Maximum distance from any village to the nearest court, 45 miles; average distance, 24 miles. Number of regular and town police, 317 men, costing £4621, being 1 policeman to about every 10·34 square miles and to every 1066 inhabitants. The daily average number of convicts in jail in 1883 was 72, of whom 6 were females. The total cost of the jails in that year was £473. The number of Government or aided schools in the District under Government inspection was 39, attended by 2255 pupils. The Census Report of 1881 returned 1896 boys and 218 girls as under instruction, besides 3247 males and 126 females able to read and write, but not under instruction.

Medical Aspects.—The plateaux enjoy a moderate and healthy climate.

The average mean temperature at Seoní town for a period of ten years ending 1881 was returned at 74.4° F., the average monthly means being as follows:—January, 63.6° ; February, 68.6° ; March, 76.9° ; April, 84.1° ; May, 87.6° ; June, 82.7° ; July, 76.3° ; August, 75.6° ; September, 76.0° ; October, 72.6° ; November, 66.3° ; December, 62.9° . In May 1883, the maximum temperature registered was 111.2° , and the minimum 67.7° ; July, maximum 88.9° , minimum 68.0° ; December, maximum 80.8° , minimum 41.7° . The average annual rainfall for a period spread over 25 years is returned at 49.47 inches—namely, 3.76 inches from January to May; 42.83 inches from June to September; and 2.88 inches from October to December. In 1883, 59.9 inches of rain fell, or 10 inches beyond the average, the excess being solely in the monsoon months, June to September. The prevailing disease is fever, which proves most dangerous during the months succeeding the rains. In 1883, two charitable dispensaries, at Seoní and Lakhnádon, afforded medical relief to 17,865 in-door and out-door patients. The number of registered deaths in 1883 was 9183, equal to a death-rate of 28.43 per thousand, of which 22.62 per thousand were assigned to fever. The average death-rate for the previous five years is returned at 32.13 per thousand. [For further information regarding Seoní, see *The Central Provinces Gazetteer*, by Mr. (now Sir Charles) Grant, pp. 468–476 (Nágpur, 1870). Also the *Settlement Report of Seoní District*, by Captain W. B. Thomson, between 1854–1866, published in 1867; the *Central Provinces Census Report* for 1881; and the several annual Administration and Departmental Reports of the Central Provinces Government.]

Seoní.—South-western *tahsil* or Sub-division of Seoní District, Central Provinces, lying between $21^{\circ} 33'$ and $22^{\circ} 27'$ N. lat., and between $79^{\circ} 27'$ and $80^{\circ} 6'$ E. long. Area, 1664 square miles, with 1 town and 692 villages, and 38,500 houses. Population (1881) 196,017, namely, males 97,761, and females 98,256; average density of population, 117.8 persons per square mile. The adult agricultural population (male and female) numbers 85,390, or 43.56 per cent. of the total population of the Sub-division; average area of cultivated and cultivable land available for each adult agriculturist, 6 acres. Of the total area of the *tahsil* (1664 square miles), 489 square miles are held revenue-free. The Government assessed area amounts to 1175 square miles, of which 550 square miles are cultivated, 224 square miles are cultivable, and 401 square miles uncultivable waste. Total amount of Government assessment, including rates and cesses levied on the land, £9414, or an average of $6\frac{1}{2}$ d. per cultivated acre. Total rental paid by cultivators, £28,706, or an average of 1s. $7\frac{3}{4}$ d. per cultivated acre. In 1884, Seoní *tahsil* contained 4 civil and 3 criminal courts, with 5 police stations (*thánds*) and 8 outpost stations; strength of regular police, 132 men; rural police or village watch (*chaukidárs*), 736.

Seoni.—Principal town and administrative head-quarters of Seoni District, Central Provinces; situated in lat. $22^{\circ} 5' 30''$ N., and long. $79^{\circ} 35'$ E., on the road from Nágpur to Jabalpur, nearly half-way between the two places. Population (1881) 10,203, namely, males 4947, and females 5256. Hindus number 6392; Muhammadans, 2803; Jains, 477; Kabírpánthís, 14; Satnámis, 9; Christians, 90; Pársis, 2; and non-Hindu aboriginal tribes, 416. Municipal income (1883-84), £1878, of which £1642 was derived from taxation; average incidence of taxation, 3s. 2d. per head. Founded in 1774 by Muhammad Amín Khán, who made it his head-quarters instead of Chhapárá. Seoni contains large public gardens, a fine market-place, and a handsome tank. Principal buildings—court-house, jail, school (which is well attended), dispensary, and post-office. The climate is healthy, and the temperature moderate.

Seoni.—Central *tahsil* or Sub-division of Hoshangábád District, Central Provinces. Area, 491 square miles, with 1 town and 151 villages, and 12,085 houses. Population (1881) 53,865, namely, males 27,368, and females 26,497; average density of population, 109·7 persons per square mile. The adult agricultural population (male and female) numbers 16,476, or 30·59 per cent. of the total population of the Sub-division; average area of cultivated and cultivable land available for each adult agriculturist, 11 acres. Of the total area of the *tahsil* (491 square miles), 169 square miles are held revenue-free. The Government assessed area amounts to 322 square miles, of which 181 square miles are cultivated, 89 square miles are cultivable, and 52 square miles are uncultivable waste. Total amount of Government assessment, including local rates and cesses levied on the land, £6579, or an average of 1s. 1½d. per cultivated acre. Total rental paid by cultivators, £17,088, or an average of 2s. 10½d. per cultivated acre. In 1884, Seoni *tahsil* contained 2 civil courts, with 1 police station (*thána*) and 3 outpost stations (*chaukis*); strength of regular police, 40 men; there are no rural police or village watch (*chaukidárs*).

Seoni.—Town and municipality in Hoshangábád District, Central Provinces; situated in lat. $22^{\circ} 28'$ N., and long. $77^{\circ} 29'$ E., on the high-road to Bombay. Population (1881) 6998, namely, Hindus, 5427; Muhammadans, 1235, Jains, 147, Kabírpánthís, 37; Christians, 8; and non-Hindu aboriginal tribes, 144. Municipal income (1882-83), £1818, of which £1342 was derived from taxation; average incidence of taxation, 3s. 10d. per head. Of the town on this site in the time of Akbar, no remains exist. The present town dates from the conquest of the country by Raghují Bhonsla about 1750, when a fort was built where an Amíl resided. A detachment of British troops from Hoshangábád took the fort in 1818. Seoni is perhaps the chief mercantile town in the whole Narbadá (Nerbudda) valley, being the entrepôt from which

the cotton of Bhopál and Narsinghpur, as well as of Hoshangábád, is exported to Bombay. Grain is the other export. Imports—English cotton fabrics, spices, and metals. The Great Indian Peninsula Railway has a station at Seoní, and a *sardí* (native inn) has been built.

Seoniband.—Artificial lake in Bhandára District, Central Provinces; situated in lat. 21° N., and long. $80^{\circ} 2'$ E., 8 miles north-west of the Nawegáon tank; about 8 miles in circumference; average depth, 30 feet; length of embankment, 630 feet. Constructed before 1550 by Dádú Patel Kohri, whose family held Seoní village for about 250 years. In the time of Raghují I., the village was granted to Báká Báí, whose descendants still own it.

Seopur (Sheopur).—Town in Gwalior State, Central India Agency; situated in lat. $25^{\circ} 39'$ N., and long. $76^{\circ} 41' 15''$ E., near the western boundary of the State. According to Thornton, it was formerly the capital of a small Rájput principality, but in the early part of the present century was subjugated by the forces of Daulat Ráo Síndhia. 'In 1816, when garrisoned by Síndhia's general, Baptiste, with 200 men, it was surprised and taken by escalade by the celebrated Rájput chief Jai Singh, who had only 60 men. The captor seized a large amount of treasure, and made the family of Baptiste prisoners.'

Seoráj.—Tract of country in Kángra District, Punjab; forming part of the Kúlu Sub-division, and lying between $31^{\circ} 20' 30''$ and $31^{\circ} 54' 30''$ N. lat., and between $77^{\circ} 14'$ and $77^{\circ} 43'$ E. long. Area, 575 square miles. This tract occupies the block of land between the Sainj and the Suttlej (Satlaj). The Jalorí or Suket' range, an offshoot of the Mid-Himálayan system, divides it into two portions, known as Outer and Inner Seoráj. The greater part of the surface is covered with forests of *deodar* and other trees; but the narrow river valleys present occasional patches of careful cultivation, interspersed with picturesque villages of wooden houses, often highly carved in a rough but effective style, and resembling Swiss *châlets*. Most of the cultivation, however, is conducted on the hill-sides. The custom of polyandry is prevalent.

Seorha.—Town in Datia State, Bundelkhand, Central India Agency; situated 36 miles east of Morár, and 40 miles north-east of Datia town. Population (1881) 7988, namely, Hindus, 6884; Muhammadans, 1102; and 'others,' 2.

Seorí Náráyan.—Eastern *tahsil* or Sub-division of Biláspur District, Central Provinces. Area, 1415 square miles, with 788 villages and 71,078 houses. Population (1881) 276,590, namely, males 136,832, and females 139,758; average density of population, 195 persons per square mile. Of the total area of the *tahsil*, 1415 square miles, 166 square miles are held revenue-free, while 348 square miles comprise the four *zaminidris* of Chápá, Katangi, Bilágirh, and Bhátgáon, which pay

only a nominal quit-rent or *peshkash*. The lands subject to regular assessment cover an area of 899 square miles, of which 505 square miles are cultivated, 343 square miles are cultivable, and 51 square miles uncultivable waste. Total Government land revenue, including local rates and cesses levied on land, £6469, or an average of 4½d. per cultivated acre. Rental paid by cultivators, £11,804, or an average of 8½d. per cultivated acre. In 1884 the Sub-division contained 1 criminal and 1 civil court, with 3 police stations (*thānds*) and 7 outpost stations (*chaukis*); strength of regular police, 66 men; village watch or rural police (*chaukidārs*), 706.

Seori Nārāyan.—Town in Bilāspur District, Central Provinces; situated in lat. 21° 43' N., and long 82° 39' E., 39 miles east of Bilāspur town, on the Mahānadi river. Population (1881) 2250, namely, Hindus, 2009; Kabirpanthis, 79; Muhammadans, 127; non-Hindu aboriginal tribes, 26; and 'others,' 9. The temple to Nārāyan (whence the name) appears, from an inscription on a tablet, to have been built about 841 A.D. It has no architectural merit. The town was once a favourite residence of the Ratanpur Court. In the rains, the Mahānadi at this point forms a fine river, navigable by large boats from Sambalpur; and even at other times, its channel retains a considerable depth of water. An important religious fair is held every February.

Seota.—Town in Sitāpur District, Oudh, situated 32 miles east of Sitāpur town, between the Chaukā and Gogra rivers. Founded by Alha, a Chandel Thākur, a *protégé* of Rājā Jai Chand of Kanauj, who granted to Alha possession of all the surrounding tract, known as Gānjar. The town contains a school, the ruins of a mosque, and an old *tilukdār's* fort. Good *bāzārs*, and annual fair. Population (1881) 3443.

Sera.—Ancient name for the Southern Division of Dravida, the present Madras Presidency.—See CHERA.

Serājgunge.—Sub-division and town of Pabnā District, Bengal.—See SIRAJGANJ.

Serampur (Srirāmpur).—Sub-division of Hūgli District, Bengal; lying between 22° 39' and 22° 55' N. lat., and between 88° and 88° 27' E. long. Area, 343 square miles; number of towns 5, and of villages 764; number of houses, 88,701, of which 7864 are unoccupied. Total population (1881) 351,955, namely, males 174,366, and females 177,589. Hindus number 292,174; Muhammadans, 59,098; Christians, 365; Buddhists, 288; Brahmos, 3; and Santāls, 27. Average density of population, 1026 persons per square mile; villages per square mile, 2·24; persons per village, 457; houses per square mile, 259; persons per house, 4·3. This Sub-division comprises the 5 police circles of Serampur, Haripāl, Krishnanagar, Singur, and Chanditalā. In 1884 it contained 3 civil and 9 criminal courts; strength of regular police, 293 men; rural police or village watch (*chaukidārs*), 1254.

Serampur (*Srīrāmpur*).—Chief town and head-quarters of Serampur Sub-division, Húglī District, Bengal; situated on the west bank of the Húglī river, opposite Barrackpur, in lat. $22^{\circ} 45' 26''$ N., and long. $88^{\circ} 23' 10''$ E. Population (1881) 25,559, namely, males 13,137, and females 12,422. Hindus number 22,800; Muhammadans, 2461; and 'others,' 298. Serampur is a first-class municipality, with an income (1883-84) of £4210, of which £3353 was derived from taxation; average incidence of taxation, 1s. $5\frac{1}{4}$ d. per head of the population (27,520) within municipal limits. The municipality includes several neighbouring hamlets; 41 metalled and 36 unmetalled roads run through the town. Serampur was formerly a Danish settlement, and remained so until 1845, when all the Danish possessions in India were ceded by treaty to the East India Company on payment of £125,000. Station on the East Indian Railway, 13 miles distant from Calcutta (Howrah station). Serampur is historically famous as the scene of the labours of the Baptist missionaries, Carey, Marshman, and Ward; the mission still flourishes, and its founders have established a church, school, college, and noble library in connection with it; there is also a dispensary here. *The Friend of India*, a weekly paper formerly published at Serampur, but now at Calcutta, once rendered this town conspicuous in the history of Indian journalism. Chief manufactures, paper and mats.

Sergada.—*Zamindāri* estate in Ganjām District, Madras Presidency. Area, 25 square miles. Population (1881) 11,562, namely, males 5762, and females 5800, occupying 1992 houses in 35 villages. Hindus number 11,554, and Muhammadans 8, dwelling in the chief village of the estate. The estate yields fine crops of rice. Traversed by the Aska-Ichapur high-road. The annual *peshkash*, or fixed Government quit-rent, is £582; rental value to the *zamindār*, £3479. Chief village, Sergadakota; population (1881) 2056, occupying 397 houses.

Seringapatam (*Srīringapatnam*).—The old capital of the State of Mysore; situated on an island of the same name in the Káveri (Cauvery), 75 miles south-east by road from Bangalore, and 10 miles north-east of Mysore city. Lat. $12^{\circ} 25' 33''$ N., long. $76^{\circ} 43' 8''$ E. Population (1881), including the suburb of GANJAM, 11,734, namely, males 5579, and females 6155. Hindus number 9789; Muhammadans, 1768; and Christians, 177. Municipal revenue (1874-75), £1048; rate of taxation, 2s. per head. Since the rendition of Mysore State, later municipal statistics are not available.

History.—The name is derived from *Srī Ranga*, one of the forms of the god Vishnu, who is worshipped by the same title on two other islands lower down the Káveri, SIVASAMUDRAM and SRIRANGAM; but his temple here takes first rank of the three, as *Adi Ranga*. Local

legend relates that Gautama Buddha himself worshipped at this shrine. According to a Tamil MS., preserved in the Mackenzie collection, the site had become overgrown with jungle, and the temple was rebuilt in 894 A.D., during the reign of the last Gangá sovereign. In 1133, the Vishnuite apostle Rámánuja received a grant of the island, with the surrounding country, from a king of the Ballála dynasty. The fort is said to have been founded in 1454 by a descendant of one of the local officers or *hebbars* appointed by Rámánuja. Seringapatam first appears in authentic history as the capital of the viceroys of the distant Hindu emperors of Vijayanagar, who took the title of Sri-ranga-ráyal. Tirumala, the last of these viceroys, surrendered in 1610 to Rájá Wodeyar, the representative of the rising house of MYSORE. Henceforth Seringapatam remained the seat of Government until the downfall of Tipú Sultán in 1799.

The existing fortifications were almost entirely constructed by Tipú, who thrice sustained a siege from British armies. In 1791, Lord Cornwallis, the Governor-General, commanding in person, advanced up to the walls, but was compelled to retire through want of provisions. In the following year he won a decisive victory in the field, and had invested the city on all sides, when Tipú purchased peace by the cession of half his dominions. Finally, in 1799, the fort was stormed by General Harris, and Tipú fell in the breach. The siege was begun in April of that year with a powerful battering train, and the assault was delivered after a bombardment of nearly one month's duration. The spot selected for breaching was in the wall facing the Káveri, for the defences were weakest on that side, and the river was at that season of the year easily fordable. After the capture, the island of Seringapatam was ceded to the British Government, who leased it to the State of Mysore for an annual rent of £5000; at the *rendition* of Mysore State in 1881, it was made over free.

When the residence of the restored Rájá was removed to Mysore city in 1800, Seringapatam immediately fell into decay. Dr. Buchanan-Hamilton, who visited the place in 1800, returned the population at 31,895 souls, as compared with 150,000 when Tipú Sultán was at the height of his power. An outbreak of epidemic fever accompanied this depopulation; and in 1811, the British military head-quarters were removed to BANGALORE. At the present day, the ruins of Seringapatam are almost deserted; and the place bears such a bad name for malaria, that no European traveller dare sleep on the island. The natives attribute this change of climate to the destruction of the sweet flag, a plant to which they assign extraordinary virtue as a febrifuge. The suburb of GANJAM, said to have been colonized by Tipú with the deported inhabitants of SIRA, is a fairly prosperous place, and crowded fairs are held three times in the year.

General Description.—The island of Seringapatam is about 3 miles in length from east to west, and 1 mile in breadth. The fort stands at its upper or western end, immediately overhanging the river. The plan is that of an irregular pentagon, with an extreme diameter of $1\frac{1}{2}$ mile. The defences, which were laid out by Tipú himself, are imposing for their massiveness, though not constructed on scientific principles. They consist of wall piled upon wall, and cavalier behind cavalier, the chief characteristic being the deep ditches cut through the solid granite. The whole remains in almost precisely the same condition as it was left after the siege, even to the breaches, except that a luxuriant growth of trees has been allowed to spring up.

The spot where the English batteries were planted is now marked by two cannons stuck upright in the ground. Inside the fort are the ruins of Tipú's palace, now partly occupied as a storehouse for sandal-wood; the old temple of Rāga-nātha-swāmi; the Jamā Masjid, a tall mosque with two minarets, built by Tipú shortly before his death; and a few traces of the palace of the early Hindu rulers. Just outside the walls is the Dariya Daulat Bāgh, or 'garden of the wealth of the sea,' a building (now falling to decay) of graceful proportions, handsomely decorated with arabesque work in rich colours. It was erected by Tipú for a summer retreat, and contains the celebrated pictures representing the defeat of Baillie at CONJEVARAM in 1780, which, after being twice defaced, were finally restored by the express orders of Lord Dalhousie when Governor-General.

At the eastern or lower end of the island, near the suburb of Ganjām, is the Lāl Bāgh or 'red garden,' containing the mausoleum built by Tipú Sultān for his father Haidar All, in which he himself lies, by his father's side. This is a square building, with dome and minarets, surrounded by a corridor which is supported by pillars of black hornblende. The double doors, inlaid with ivory, were the gift of Lord Dalhousie. The inscription on the tombstone of Tipú relates how he died a martyr to Islām, and at the same time indicates by the initial letters the date of his death. Each of the two tombs is covered with a crimson pall, and the expenses of the place are defrayed by Government. The island of Seringapatam yields valuable crops of rice and sugar-cane, which are watered from a canal originally constructed by Tipú, and brought across from the mainland by an aqueduct.

Seringham.—Town and famous temple in Trichinopoly District, Madras Presidency.—*See* SRIRANGAM.

Sesa.—River in the south of Lakhimpur District, Assam, which rises in a marsh near the village of Bājaltali, and, flowing south-west in a very circuitous course, empties itself into the Burī Dihing near its junction with the Brahmaputra. During the rainy season, the Sesa is navigable by canoes for a considerable distance.

Sesháchalam.—Hill range in Cuddapah (Kadapa) District, Madras Presidency; an offshoot of the Pálkonda Hills, skirting the east and north-east of the District. Lat. $14^{\circ} 12'$ to $14^{\circ} 35'$ N., long. $78^{\circ} 1' 30''$ to $78^{\circ} 56'$ E. The hills are uniform in appearance, and rise from 1200 to 1800 feet above the level of the sea. There are no isolated peaks. The Sesháchalam Hills strike off in a westerly direction from the Pálkonda range at a point about 15 miles south of the Penner (Ponnaiyár) river. In some parts they are clothed with rich forests, and the scenery is very beautiful.—See also PÁLKONDA.

Settipattadai (or *Tiruváddi*, *Triváddi*).—Town in Cuddalore *táluk*, South Arcot District, Madras Presidency. Lat. $11^{\circ} 46'$ N., long. $79^{\circ} 36' 35''$ E., 15 miles west of Fort St. David. Population (1881) 4566, namely, Hindus, 4273; Muhammadans, 284; and Christians, 9. Number of houses, 569. Except as the seat of a sub-magistrate, Settipattadai is now of no importance; but it was the scene of frequent fighting during the Karmátik wars of the last century. The French occupied it in 1850; Lawrence captured it in 1752. In the following year it was three times attacked by the French; the third time successfully. In 1760, it again fell into the hands of the English.

Settúr.—Town in Srivillipatur *táluk*, Tinneveli District, Madras Presidency. Lat. $9^{\circ} 26'$ N., long. $77^{\circ} 31' 20''$ E. Population (1881) 6443, occupying 1449 houses. Hindus number 6300; Muhammadans, 90; and Christians, 53. The *samindár* is of the Maravar caste, and is descended from an old *pálegár* family, who ruled Tinneveli as feudal chiefs dependent on the Madura kingdom. The estate is situated at the south-west corner of Srivillipatur *táluk*. It is well irrigated from the mountains, a portion of which, including fine forests, is claimed by the *samindár*. The area and population of the estate are not returned separately in the Census Report of 1881. The *samindár* pays annually a *peshkash* or fixed revenue of £1254. The rental amounts to £3624.

Seven Pagodás.—Town in Chengalpat (Chingleput) District, Madras Presidency.—See MAHABALIPUR.

Severi (*Seberi*).—River in Madras Presidency.—See SABARI.

Sewan.—Sub-division of Sárán District, Bengal. Area, 853 square miles, with 1 town and 1460 villages, number of houses, 121,204, of which 104,848 are occupied and 16,356 unoccupied. Total population (1881) 749,482, namely, males 359,734, and females 389,478; proportion of males, 48 per cent. Hindus number 642,927; Muhammadans, 106,438; and 'others,' 117. Number of inhabitants per square mile, 878; villages per square mile, 171; persons per village, 513; houses per square mile, 142; inmates per house, 7. This Sub-division consists of the 3 police circles of Sewan, Daraulf, and Basantpur. It contained in 1884, 1 civil and 2 criminal

courts, a regular police force of 92 men, and 1805 village watchmen.

Sewan.—Town in Sāran District, Bengal.—See ALIGANJ SEWAN.

Sewan (*Siwan*).—Town in Kaithal *tahsil*, Karnāl District, Punjab; situated in lat. $29^{\circ} 42'$ N., and long. $76^{\circ} 25'$ E., about 6 miles west of Kaithal town. Population (1881) 5717, namely, Hindus, 3252; Muhammadans, 2454; and Sikhs, 11. Number of houses, 287. The town itself is an unpretentious collection of native houses, without any building of importance. Its lands include an enormous hollow in which rice is extensively grown with the aid of the floodwaters of the Saraswatī. On the stream is an old Mughal bridge and an abandoned village site of great size, where ancient bricks and Indo-Scythian coins are found in considerable numbers. This site is locally known as Teh Polar.

Sewāni.—Town in Hissār *tahsil*, Hissār District, Punjab; distant from Hissār town 21 miles south. Population (1881) 3694, chiefly Muhammadan Rājputs, many of whom enjoy the title of Rāo. Thriving and prosperous town, said to have escaped unhurt from the periodical famines which ravage the dry surrounding tract.

Shabkadar (*Shankargarh*).—Town and fort in Doābā-Dāūdzaī *tahsil*, Peshāwar District, Punjab; situated in lat. $34^{\circ} 10' 30''$ N., and long. $71^{\circ} 33'$ E., about 3 miles from the foot of the western hills, and 17 miles north-east of Peshāwar city. The village is the seat of one of the chief Gigidāni families in the Doābā, and contains a number of wealthy traders. The village sprung up around the fort of Shankargarh, built by the Sikhs on a mound about a mile north of the village. The fort is now strongly fortified, and garrisoned by a force under the command of a field officer. In the centre of the fort is a high bastion called the cavalier, which commands an extensive view of the surrounding country. The garrison consists of infantry and cavalry, who are relieved from Naushahra. The fort and village contains (1881) a total population of 1367, namely, Muhammadans, 667; Hindus, 663; Sikhs, 29; and Christians, 8. Municipal income (1881), £188. Dispensary and police station.

Shāhābād.—British District in the Lieutenant-Governorship of Bengal, lying between $24^{\circ} 31'$ and $25^{\circ} 43'$ N. lat., and between $83^{\circ} 23'$ and $84^{\circ} 55'$ E. long. Area, 4365 square miles. Population, according to the Census of 1881, 1,964,909 souls. Shāhābād forms the south-western portion of the Patnā Division. It is bounded on the north by the District of Ghāzipur in the North-Western Provinces, and the Bengal District of Sāran; on the east by Patnā and Gayā Districts; on the south by Lohārdagā; and on the west by the Districts of Mīrzāpur, Benares, and Ghāzipur, in the North-Western Provinces. On the north and east, the boundary is marked by the Ganges and Son (Soane)

rivers, which unite in the north-eastern corner of the District. Similarly, the Karamnása forms the boundary with the North-Western Provinces on the west, from its source to its junction with the Ganges near Chausá; and the Son is the boundary with Lohárdagá on the south. The administrative head-quarters are at the town of ARRAH.

Physical Aspects.—Sháhábád naturally divides into two distinct regions, differing in climate, scenery, and productions. The northern portion, comprising about three-fourths of the whole area, presents the ordinary flat appearance common to the valley of the Ganges in the Province of Behar; but it has a barer aspect than the trans-Gangetic Districts of Sárán, Darbhāngah, and Muzaffarpur. This tract is entirely under cultivation, and is dotted over with clumps of trees—mangoes, *mahuá*, bamboos, palms, etc. The southern portion of the District is occupied by the Káimur hills, a branch of the great Vindhyan range. The area of these hills situated within Sháhábád is 799 square miles. The boundaries of the hills, though well defined, are very irregular, and often indented by deep gorges scoured out by the hill streams. The edges are generally very precipitous, and huge masses of rocks which have fallen from the top obstruct in many places the river channels below. The summit of the hills consists of a series of saucer-shaped valleys, each a few miles in diameter, with a deposit of rich vegetable mould in the centre, on which the finest crops are produced. There are several *gháts* or ascents to the top, some of which are practicable for beasts of burden. Two of the most frequented of these passes are Sarkí and Khariyari—the first near the south-western boundary, the second in a deep gorge north of Rohtás. Two passes on the north side are more accessible,—one, known as the Khulá *ghát*, is 2 miles south of Sásserám; the other is at Chhanpathar, at the extreme west of the District, where the Karamnása forms a waterfall. The slopes to the south are covered with bamboo, while those on the north are overgrown with a mixed growth of stunted jungle. The general height of the plateau is 1500 feet above the level of the sea.

The SON and the GANGES may be called the chief rivers of Sháhábád, although neither of them anywhere crosses the boundary. The District occupies the angle formed by the junction of these two rivers, and is watered by several minor streams, all of which rise among the Káimur hills and flow north towards the Ganges. The most noteworthy of these are the following:—The Karamnása, the accursed stream of Hindu mythology, rises on the eastern ridge of the Káimur plateau, and flows north-west, crossing into Mírzápur District near Kulhuá. After a course of 15 miles in that District, it again touches Sháhábád, which it separates from Benares; finally it falls into the Ganges near Chausá. The Dhobá or Kao rises on the plateau, and flowing north, forms a fine waterfall, and enters the plains at the Tarrachándí Pass, 2

miles south east of Sisserām. Here it bifurcates—one branch, the Kudra, turning to the west, and ultimately joining the Karamnāsa; while the other, preserving the name of Kāo, flows north and falls into the Ganges near Gāghāt. The Dargauti rises on the southern ridge of the plateau, and after flowing north for 9 miles, rushes over a precipice 300 feet high, into the deep glen of Kadhar Klio; eventually it joins the Karamnāsa, passing on its way the stalactite caves of Gupta and the hill-fortress of Shetgarh. This river contains water all the year round; and during the rains, boats of 1½ ton burthen can sail up stream 50 or 60 miles from its mouth. The chief tributaries of the Dargauti are the Sūrā, Korā, Gonhuā, and Kudra.

No system of forest conservancy prevails, and the forests have consequently been denuded of their best timber, more especially on the slopes of the hills. With the exception of the Government estate of Bānskati, these jungle tracts are the property of the hill *zamīndars*, who derive a revenue from them from the sale of wood, and a grazing tax. Large herds of cattle are annually driven up the hills in charge of Ahirs to graze on the upland pasturage. Each animal pays a tax of 4 *annās* (6d.) for the season. Stick-lac is collected by the Khāwārs in the jungles, worked up locally into bracelets, and is also used as a dye.

Minerals.—*Kankar*, or nodular limestone, is found in most parts of the plains, especially in the beds of rivers and along the banks of the Son. Where the nodules are large, it is used as a road metal; but where small, it is generally burnt for lime. The Kāimur hills consist almost entirely of red sandstone, overlying fossiliferous limestone. The former is largely used in building, for which, on account of its durability, it is admirably adapted. As instances of this quality, it may be mentioned that the works erected of this stone by Sher Shāh and his family, now more than three centuries old, show not the slightest traces of decay; and there are inscriptions nine hundred years old, equally unaffected. Sandstone is largely quarried by the Irrigation Department, and by private individuals for sugar mills, millstones, curry stones, and pottery wheels. Limestone is found in large quantities at the bottom of the precipices which surround the table land and its detached ridges, in the deep glens behind Shetgarh, and in the bed of the Karamnāsa. The lime-burners pay a royalty to the *zamīndars* of Rs. 2 for every 100 *maunds* quarried. Alum, slate, and martial pyrites are also found, producing an impure sulphate of iron, but the deposits are nowhere worked.

Wild Animals.—In the hilly southern portion of the District, large game abounds. Tigers, bears, and leopards are common; five or six varieties of deer are found; and among the other animals met with are the wild boar, jackal, hyænx, and fox. The *shyādi* (blue cow), the Antelope *picta* of naturalists, is seen on the Kāimur table land. Of

game birds, the barred-headed goose (*Anser indicus*) is common. The black-backed goose (*Sarkidornis melanotus*) and the grey goose (*A. cinereus*) are also to be found. The former is very rare in Lower Bengal, and the latter is seldom seen south of Central India, though it is a common visitor in the north. The other game birds of the District include many varieties of wild duck (the most remarkable being the sheldrake), several kinds of teal, partridges, curlews, and pea-fowl, jungle-fowl, snipe, and golden and common plovers.

The Son Canals.—The project of irrigating Sháhábád District by a comprehensive scheme of canals, which should also be navigable, dates from 1855, when Colonel Dickens proposed the construction of canals from Patná westwards to Chanár, a project subsequently extended to Monghyr in the one direction and to Mírzápúr in the other. It was, however, finally decided in 1871 that the original scheme should not be extended, and it is still an open question whether the Main Western Canal shall be extended even as far as Chanár. The work was commenced in 1869 by the construction of an anicut or weir at Dehri-on-Son, about half a mile south of the causeway which carries the Grand Trunk Road from Bárú to Dehri. This weir is 12,500 feet long by 120 broad, and 8 feet above the normal level of the river bed. It constitutes the head-work of the system. The Main Western Canal, starting from here, has to carry up to the fifth mile, where the ARRAH CANAL branches off in a north-westerly direction, 4511 cubic feet of water per second, to irrigate 1,200,000 acres, only 600,000 of which require simultaneous irrigation. The Arrah Canal takes off 1616 cubic feet of water per second, which leaves 2895 cubic feet up to the 12th mile, where the BAXAR and CHAUSA CANALS branch off in a northerly direction, abstracting a further quantity of 1260 cubic feet per second. In aligning the Main Western Canal, the great object was to escape a heavy cutting 30 feet deep at Dehri, and carry the water along the ridges of the country. It curves round in a northerly direction to the head-works of the Arrah Canal, then bends to the west, crossing the Kao by means of a siphon aqueduct at Bihyá, and finally stops on the Grand Trunk Road 2 miles west of Sasseram. The distance from Dehri to this point is 21½ miles. The length of the Arrah Canal is 60 miles from Dehri to the point where it enters the Gangá *nadi*, by which it communicates (a farther distance of 10 miles) with the Ganges. With its two branches, the BIHIYA and DUMRAON CANALS, the Arrah Canal commands an area of 441,500 acres. The Bihyá Canal, 30½ miles long, has 7 distributaries; and the Dumraon branch, 40½ miles long, has 12. The Arrah Canal has, in addition to these two branches, 4 principal distributaries. The total length of the Baxár and Chausá branches is 85 miles, and they command with their distributaries the country between the Kao and the Dunáut on the west, a tract which

greatly needs irrigation. As a rule, the canals run in such a way that they do not cross the natural drainage channels of the country; but where this is not so, siphons have been provided which allow the water to pass under the canal unhindered. Many of the works being still incomplete, it is not possible to give at present a trustworthy estimate of the total cost of the work. There can be little doubt that these canals have conferred upon Sháhábád entire immunity from future famines. As far as the Son readings have gone, they show that a minimum supply of 3000 cubic feet of water per second can be depended upon up to the 15th of January; and this would suffice to irrigate 480,000 acres. But many of the cold-weather crops will have been completely irrigated before this date, so that the amount of water required decreases equally with the volume of the stream. Thus, peas, which occupy a very large area, generally receive their last watering about Christmas, when the supply is 3500 cubic feet per second. Generally speaking, three waterings are required for the cold-weather crops—one early in November, one in December, and one in the middle of January. After February, the supply of water decreases very rapidly; and though in exceptional years of high flood, irrigation might be carried on up to March and April for sugar-cane and indigo, these crops can only be occasionally watered or drenched in an ordinary year.

Population.—Sháhábád was one of the Districts statistically surveyed in the beginning of the present century by Dr. Buchanan-Hamilton, who made the area 4087 square miles, and the population 1,419,520. According to a later estimate, based upon the Survey of 1844-46, the area was returned at 4404 square miles, and the population at 1,602,274. The Census of 1872 disclosed a total population of 1,723,974 persons upon the area of the District as at present constituted. The last Census in 1881 returned the population at 1,964,909, showing an increase of 240,935, or 13.97 per cent., between 1872 and 1881. This large increase in nine years is due entirely to natural causes, the District not having suffered from exceptional disease, and cultivation having been largely developed during these years, owing to the opening of irrigation canals.

The results of the Census of 1881 may be summarized as follows:—Area of District, 4365 square miles; number of towns 10, and villages 5631; number of houses, 312,762, namely, occupied 274,934, and unoccupied 37,828. Population 1,964,909, namely, males 950,250, and females 1,014,659; proportion of males, 48.4 per cent. Average density of population, 450 persons per square mile, ranging from 917 per square mile in Arrah *thana*, and 777 per square mile in Belauti in the thickly populated tracts in the neighbourhood of the Ganges, to 188 per square mile in Dhabuá, and 225 per square mile in Sásserám in the west and south of the District, where there is much

hilly and uncultivated land. Number of towns and villages throughout the District, 129 per square mile; persons per town or village, 348; houses per square mile, 71.65; inmates per occupied house, 7.15. Classified according to sex and age, the Census gives the following results—under 15 years of age, boys 394,940, and girls 370,788; total children, 765,728, or 38.9 per cent. of the District population: 15 years and upwards, males 555,310, and females 643,871; total adults, 1,199,181, or 61.1 per cent.

Religion.—The great majority of the people are Hindus by religion, that faith being professed by 1,817,881 persons, or 92.5 per cent. of the total population; Muhammadans number 146,732, or 7.4 per cent.; Christians, 276; and 'others,' 20. Among the higher castes of Hindus, Bráhmans numbered 213,308; Rájputs, 207,195; Bábhans, 59,075, Káyasths, 46,994; and Baniyás, 34,568. The lower or Súdra castes included the following:—Goálá, cattle dealers, herdsmen, and dairymen, who form the most numerous caste in the District, 242,721; Koerí, the principal agricultural caste, 152,846; Chamárs, 119,010; Dosádh, 90,155; Kandu, 68,427; Kúrmí, 66,341; Káhár, 62,812; Telí, 47,836; Lohár, 32,563; Nápit, 29,153; Bind, 24,582; Garerí, 23,817; Kumbhár, 23,814; Kalwár, 20,126; Nuniyá, 18,666; Sonár, 18,139; Dhobí, 16,741; Mallah, 14,943; Barhái, 14,741; Musahár, 12,912; Pásí, 11,894; Tántí, 7016; Rájwar, 6802; Dom, 5732; Tambulí, 5456; Máli, 5100; Madak, 4836; Sunn, 4409; Keut or Kewat, 3389; Tatwá, 3372; Baruí, 2573, and Jugí, 2167. Caste-rejecting Hindus numbered 3033, of whom 1542 were Vaishnavs. Hinduized aboriginal tribes were returned at 31,401, including Gonds, 7089, Khárwárs, 5959; Bhuiyás, 301; and 'others,' 18,052. The Muhammadans were divided according to sect into—Sunnís, 142,435, Shías, 3106, and unspecified, 1191. The Christian community consisted of—Europeans, 166; Eurasians, 78; natives of India, 10; and 'others,' 22. By sect, 220 were Protestants or belonging to the Church of England, 40 were Roman Catholics; and 16 unspecified.

Urban and Rural Population.—Sháhábád District contains eight towns with more than five thousand inhabitants, namely, ARRAH, population (1881) 42,998; DUMRAON, 17,429; BUXAR, 16,498, JAGDISPUR, 12,568; BHOJPUR, 9278, NASRIGANJ, 6063; BHAEUA, 5728; and DHANGAIN, 5600. Two other towns are returned as municipalities, but with less than five thousand inhabitants, namely, CHENARI, 3336; and SASSERAN, 2531. The total urban population thus disclosed is 122,029, or 6.2 per cent. of the District population. There are altogether nine municipalities in the District, with a total population of 126,163; municipal income (1883-84), £5464, of which £3888 was derived from taxation; average incidence, 7.2d. per head of population within municipal limits. Of the 5631 villages, 2919 contain less

than two hundred inhabitants; 1611 between two and five hundred; 772 between five hundred and a thousand; 254 between one and two thousand; 53 between two and three thousand; and 21 between three and five thousand. As regards occupation, the Census Report divides the male population into the following six classes:—(1) Professional class, including all Government servants, civil and military, 12,155; (2) domestic class, including inn and lodging-house keepers, 36,073; (3) commercial class, including merchants, bankers, traders, carriers, etc., 35,728; (4) agricultural and pastoral class, including gardeners, 307,604; (5) manufacturing and industrial class, including all artisans, 83,473; (6) indefinite and non-productive class, comprising general labourers and male children, 475,217.

Antiquities.—The principal place of interest in the District, from an antiquarian point of view, is the fort of Rohtás or ROHTASGARH, so called from Prince Rohitáswa, son of Harischandra, one of the kings of the Solar dynasty. The present buildings were erected by Mán Singh, soon after he was appointed Viceroy of Bengal and Behar in 1644. The remains of the fortress occupy a part of the Káimur table-land, measuring about 4 miles from east to west, and 5 miles from north to south. Other places of interest in Sháhábád are the ruins of Shergarh fort, named after Sher Sháh, its founder; Chainpur fort, with several interesting monuments and tombs; Darautí and Baidyanáth, with ruins attributed to the Suars or Sivrás; Masár, the Mo-ho-so-lo of Híuen Tsiang; Chausá, the scene of the defeat of Humáyún in 1539 by Sher Sháh; Tilothu, near which are a fine waterfall and a very ancient Cheru image; and Pataná, once the capital of a Hindu Rájá of the Suar tribe. A description of these places will be found under their respective names. The sacred cave of Guptasar lies in the centre of the Káimur plateau, 7 miles from Shergarh.

The town of Arrah is invested with a special historical interest, as being the scene of a stirring episode in the Mutiny of 1857. A body of rebels, consisting of about 2000 Sepoys from Dinápur and four times as many armed villagers, under Kuár Singh, marched in the end of July on Arrah. They reached the town on the 27th of that month, and forthwith released all the prisoners in the jail, and plundered the treasury. The European women and children had already been sent away, but there remained in the town about a dozen Englishmen, official and non-official, and three or four other Christians of different races. The Commissioner of Patná, Mr. Tayler, had supplied a garrison of 50 Sikhs. This small force held out for a long eight days, until rescued by Major Vincent Eyre. The centre of defence had been wisely chosen. At this time the East Indian Railway was in course of construction, under the local superintendence of Mr. Vicars Boyle, who, fortunately, had some knowledge of

fortification. He occupied two houses, now known as the Judge's houses, the smaller of which, a two-storied building about 20 yards from the main house, was forthwith fortified and provisioned. The lower windows, etc. were built up, and sand-bags ranged on the roof.

When the news came that the mutineers were advancing along the Arrah road, the Europeans and Sikhs retired to the smaller house. The rebels, after pillaging the town, made straight for Mr. Boyle's little fortress. A volley dispersed them, and forced them to seek the shelter of the larger house, only a few yards off, whence they carried on an almost continuous fire. They attempted to burn or smoke out the little garrison, and tried various other safe modes of attack, but they had no guns. Kuár Singh, however, produced two small cannon which he had dug up, and artillery missiles were improvised out of the house furniture. In the small house there was no thought of surrender. Mr. Herwald Wake, the Magistrate, put himself in command of the Sikhs, who, though sorely tempted by their countrymen among the mutineers, remained faithful throughout the siege. A relieving party of 150 European troops, sent by water from Dinápur, fell into an ambuscade on landing in Sháhábád; and as time passed away and no help arrived, provisions and water began to run short. A bold midnight sally resulted in the capture of 4 sheep, and water was obtained by digging a well 18 feet deep inside the house. A mine of the enemy was met by countermining.

On the 2nd August, the besieged party observed an unusual excitement in the neighbourhood. The fire of the enemy had slackened, and but few of them were visible. The sound of a distant cannonade was heard. Before sunset the siege was at an end, and on the following morning the gallant garrison welcomed their deliverers—Major Vincent Eyre with 150 men of the 5th Fusiliers, a few mounted volunteers, and 3 guns with 34 artillerymen. Major Eyre had dispersed Kuár Singh's forces on his way to Arrah, and they never rallied.

Agriculture.—The chief staple of Sháhábád is rice, of which three principal crops are grown, namely—the *bhadái* or early crop, which is sown in July or August, and ripens in about sixty days; the *báiwag*, sown broadcast in June or July, and reaped in November and December; and the *ropá* or winter crop, which is also sown in June and July, and reaped in December and January. Besides these, a very limited area is planted with *boro* rice, sown in November and cut in April. Many varieties of each rice crop are named. The other crops of the District include—wheat, barley, maize, and other cereals; gram, peas, lentils, and several other green crops; *til*, linseed, castor-oil, and mustard; many kinds of vegetables; cotton, hemp and jute, poppy, sugar-cane, betel-leaf, tobacco, safflower, indigo, etc. Roughly speaking, it may be estimated that of the total area (2,808,400 acres) of the

District, 2,200,000 acres are under cultivation. The area usually covered by autumn (*bhādai*) and winter (*aḡhāni*) food crops is about 1,500,000 acres; that occupied by spring or *rafi* food crops, 600,000 acres; and that under other than food staples, 100,000 acres. The area under poppy is about 22,000 acres (average out-turn, $27\frac{1}{2}$ lbs. of opium per acre); that under tobacco, only 300 acres.

Shahabād has, on the whole, a much drier soil than the trans-Gangetic Districts of Sāran, Muzaffarpur, and Darbhanga. Along the north of the District runs a fringe of low-lying *khāḡir* land, representing the bed of the Banās or old Ganges, which is inundated for about four months every year, when the main stream is in full flood. Cold-weather crops of the finest character are grown here, on a soil enriched by the silt brought down by every flood. Very little land has been rendered uncultivable owing to blown sand from the bed of the Son (Soane). The soil is light for a few miles west of that river during the greater part of its course, except at its mouth, where the influence of the Ganges makes itself felt. This light soil may be divided into two classes—one consisting of fine sand mixed with a loose mould; the other a very tenacious clay, intermixed with a good deal of coarse sand. Both soils, so long as they are kept moist, produce good crops; but without irrigation they grow nothing, except a few pulses sown in the rains. Throughout the District, a free mould forms a large portion of the soil; when quite free, it is known as *dorāi*, *faira*, and *dhāsh*; when mixed with a little clay, it is called *sigat*. This last soil is especially suited for rice. Clay or *hangar* lands are considered the best, on the whole, as they retain moisture very well, and produce cold-weather crops without irrigation. The soil in the saucer-shaped valleys on the Kāimur plateau is a rich and purely vegetable mould, swept down from the hills above.

A holding of above 100 acres in extent is considered a very large farm, and anything below $3\frac{1}{2}$ acres a very small one. A fair-sized comfortable holding for a husbandman cultivating his own lands would be about 13 acres. A small-sized holding of 5 acres, which is as much as a single pair of bullocks can cultivate, would not make a peasant so well off as a respectable retail shopkeeper; but it would enable him to live as well as a man receiving 16s. a month in money wages.

Shahabād District contains a small but increasing class of day-

labourers, called *tanikār*, who neither possess nor rent lands, but only on their wages. These men often hire themselves out by the day, or by the month, and are paid by a share (sometimes amounting to one-sixteenth) of the produce. In this case they are called *laykāt*. They occasionally supply half the seed and half the number of cattle required. It is supposed that this class first sprang up when the railway was being constructed; and it has been largely fostered by the demand for labour on the Son Canal works.

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Agriculture.—The chief staple of Sháhábád is rice, of which three principal crops are grown, namely—the *bhadai* or early crop, which is sown in July or August, and ripens in about sixty days; the *biswas*, sown broadcast in June or July, and reaped in November and December; and the *ropá* or winter crop, which is also sown in June and July, and reaped in December and January. Besides rice, a small area is planted with *boro* rice, sown in November, rice, betel-nut, &c. Many varieties of each rice crop are named. Grass, zinc, copper, of the District include—wheat, barley, maize, and other ways of trade to peas, lentils, and several other green crops; *sil*, linseed Indian Railway. mustard; many kinds of vegetables; cotton, hemp &c. of 60 miles, from sugar-cane, betel-leaf, tobacco, safflower, indigo, &c. ing, it may be estimated that of the total area (2,8

Koelwár station on the Son to Chausá on the Karainnása, the intermediate stations being Arrah, Bihlyá, Raghunáthpur, Dumráon, and Baxár. The aggregate length of roads in the District, exclusive of village tracks, is about a thousand miles, maintained from the proceeds of a road cess of 1 per cent. on the land revenue of the District. The principal manufactures are sugar, paper, saltpetre, blankets, coarse cotton cloth, and brass utensils. The figures supplied for the first edition of this work returned 58 sugar refineries in the District in 1872-73 (of which 42 were at Nasriganj), and the amount manufactured at 965 tons, valued at £28,350. Statistics for a later year are not available. Paper is made at Sáhár and Harharganj, both on the Son; and blankets and carpets in the Sásसरám and Bhabuá Sub-divisions.

Administration.—So far as can now be ascertained, it would appear that the net revenue of Sháhábád increased from £101,851 in 1790-91 to £167,277 in 1849-50, to £233,978 in 1870-71, and to £253,554 in 1883-84; while the net expenditure, in like manner, increased from £5627 in 1790-91 to £25,046 in 1849-50, and to £44,158 in 1870-71; while it fell to £37,937 in 1883-84. The land-tax forms the principal item of revenue here, as elsewhere in Bengal; and the amount collected increased from £97,508 in 1790 to £171,263 in 1883-84. The number of estates has more than doubled in the same time, being 2330 in 1790, and 5961 in 1883; while the number of proprietors has increased by nearly fifty-fold, namely, from 1289 in 1790 to 50,410 in 1883. In the former year, the average amount paid by each proprietor was £80, 14s., and in the latter year, £3, 8s.

For administrative purposes, the District is divided into 4 Sub-divisions, and 11 *thánás* or police circles, as follows:—(1) Arrah or headquarters Sub-division, with the three police circles of Arrah, Belauti, and Piru; (2) Baxár Sub-division, with the two police circles of Baxár and Dumráon; (3) Sásसरám Sub-division, with the four police circles of Sásसरám, Kharghar, Dhangáin, and Dehrí; and (4) Bhabuá Sub-division, with the two police circles of Bhabuá and Mohaniá. Number of civil judges (1883-84), 8; stipendiary magistrates, 12. In 1883 the regular and town police force numbered 611 officers and men of all ranks, maintained at a total cost of £10,024. There was also a rural police or village watch of 4854 men, costing in money or lands an estimated sum of £10,996. The total machinery, therefore, for the protection of person and property consisted of 5465 officers and men, giving 1 man to every 0.79 square mile of the area or to every 359 persons of the population. The estimated total cost was £21,020, equal to an average of £4, 16s. 4d. per square mile of area and nearly 2½d. per head of population. In 1883-84, 2562 persons were convicted of an offence of some sort, great or small. The District has 4 jails, which contained in 1883 an average daily number of 214 prisoners.

The number of Government and aided schools in Sháhábád in 1856-57 was 8, with 354 pupils; in 1870-71 there were only 13 such schools, attended by 589 pupils. Since the latter year, however, owing to the encouragement of primary education by an extension of the grant-in-aid system, the number of Government and aided schools has largely increased. In 1871-72 there were 47 schools, with 1572 pupils; and in 1877-78 there were 282, attended by 7211 pupils. In 1883-84, by which time the grant-in-aid system had received full development, there were 1337 lower primary schools under Government inspection, attended by 20,883 pupils. The Arrah District school had 464 pupils in 1883-84. The Census of 1881 returned 13,960 boys and 385 girls as under instruction, besides 36,930 males and 1024 females able to read and write but not under instruction.

Medical Aspects.—The climate of Sháhábád is fairly healthy. The prevailing endemic diseases are intermittent and remittent fevers, bowel complaints, and skin diseases. Cholera and small-pox occur from time to time in an epidemic form. The total number of registered deaths in the District in 1883-84 was 36,930, showing a death-rate of 21·28 per thousand. Seven charitable dispensaries afforded medical relief in 1883 to 690 in-door and 37,169 out-door patients. Average annual rainfall for 25 years ending 1881, 45·24 inches, distributed as follows:—January to May, 4·08 inches; June to September, 38·15 inches; and October to December, 3·01 inches. In 1883-84 the rainfall was 32·19 inches, or 13·05 inches below the average, the deficiency being conspicuous in all three seasons. [For further information regarding Sháhábád, see *The Statistical Account of Bengal*, by W. W. Hunter, vol. xii. pp. 157-294 (Trubner & Co., 1877); Dr. Martin's Edition of the *Statistics of Behár and Sháhábád*, collected by Dr. Buchanan-Hamilton (circa 1807) under the orders of the Government of India. Also the *Bengal Census Reports* of 1872 and 1881; and the several annual Administration and Departmental Reports of the Government of Bengal.]

Sháhábád.—*Tahsil* or Sub-division of Hardoi District, Oudh, lying between 27° 24' and 27° 47' N. lat., and between 79° 43' and 80° 21' E. long. Bounded on the north by Sháhjahanpur District in the North-Western Provinces, on the east by Muhamdi *tahsil*, on the south by Hardoi *tahsil*, and on the west by Farukhábád District in the North-Western Provinces. Area, 539 square miles, of which 310 are cultivated. Population (1881) 216,825, namely, Hindus, 189,000; Muhammadans, 27,823; and 'others,' 2. Males 116,752, and females 100,073; average density of population, 402 persons per square mile. Of the 520 towns and villages in the *tahsil*, 397 contain less than five hundred inhabitants; 92 between five hundred and a thousand; 29 between one and five thousand; and 2 upwards of five thousand inhabitants.

Government land revenue, £8836. This Sub-division comprises the 8 *pargands* of Sháhábád, Alamnagar, Piháni, Mansurnagar, Sára (North), Saromannagar, Páli, and Pachhoha. In 1884 it contained 1 civil and 3 criminal courts; police circles (*thánds*), 3; regular and town police, 118 men; village watch or rural police (*chaukidárs*), 595.

Sháhábád.—*Parganá* of Hardoi District, Oudh. Bounded on the north by Sháhjahánpur District in the North-Western Provinces; on the east by Alamnagar and Sára, the Sukheta river forming the boundary line; on the south by Saromannagar; and on the west by Pachhoha and Páli, from which it is separated by the Garra river. Area, 131 square miles, of which 81 are cultivated. Chief products—wheat, barley, *báyra*, gram, *joár*, rice, *arhar*, and sugar-cane. At the time of the revenue survey, wheat occupied about one-third of the cultivated area; barley and *báyra* each about a tenth; and gram, *joár*, and rice together about a fourth. Population (1881) 67,182, namely, Hindus 55,867, and Muhammadans 11,315. Of the 143 villages that make up the *parganá*, 72 are held by Muhammadans, 25½ by Bráhmans, 21½ by Rájputs, 9 by Káyasths, 1 by Gosáins, 1 by Europeans, and 13 by the Government. The varieties of tenure are—*tálukdári*, 26 villages; *zaminidári*, 82, and *pattidári*, 35. Government land revenue, £9342, equal to an average of 3s. 7½d. per cultivated acre, or 2s. 2½d. per acre of total area. The Oudh and Rohilkhand Railway runs through the *parganá*, with a station near Sháhábád town.

The country was originally in the hands of the Thatheras, whose chief settlement seems to have been at and around Angni Khera, on the site of Sháhábád town. They are said to have been dispossessed in the 8th century A.D. by a band of Bráhmans, who were on a pilgrimage from Benares to Hardwar. The Bráhmans retained possession of Angni Khera and the surrounding country till the reign of Aurangzeb, when, having plundered a convoy of treasure on its way to Delhi, a retaliatory expedition was sent out under an Afghán chief, Diler Khán, who surprised the Bráhmans at a bathing festival, slew them, and took possession of their lands, which were confirmed to him by the Delhi Emperor. Diler Khán founded the town of Sháhábád on the old site of Angni Khera, which he filled with his Afghán kinsmen and troops, assigning them jungle grants in the neighbourhood. Diler Khán's family gradually extended their possessions, acquiring either by purchase, mortgage, fraud, or force, every village in the *parganá*, which they held as proprietors till some fifty or sixty years ago, when the family began to decay and the estate to fall to pieces. The old proprietors in some cases succeeded in recovering possession of their villages, mostly by purchase from the Nawáb's family. The descendants of Diler Khán, however, still hold possession of more than one-half of the *parganá*.

Sháhábád.—Town and municipality in Hardoi District, and headquarters of Sháhábád *tahsil* and *parganá*; situated on the road from Lucknow to Sháhábád, 15 miles from the latter town, in lat. $27^{\circ} 38' 25''$ N., and long. $79^{\circ} 59' 5''$ E. The most populous town in the District, and the fourth largest in Oudh. Population (1881) 18,510, namely, males 9210, and females 9300. Hindus number 10,784, and Muhammadans 7726. Municipal income (1883-84), £383, of which £312 was derived from taxation; average incidence of taxation, 4d. per head.

The town is divided into wards or *mahallas*, named for the most part after the companions in arms of the founder, Diler Khán. It is connected with Sháhjahánpur, Páli, Sándi, Hardoi, and Piháni by unmetalled roads; it is also a station on the Oudh and Rohilkhand Railway. The Sub-divisional courts and police station are placed in the enclosure of the Jamá Masjid, a mosque built by Diler Khán. Vernacular school, dispensary, and *sarái* (travellers' rest-house). No trade or manufacture of importance. Several markets are held in the different wards.

Sháhábád town has decreased in importance during the past hundred years, the inhabitants dating the decay from the decline of the Delhi Empire, and the rise of Oudh to independence. The present population is said to be only one-third of what it was formerly. Tieffenthaler describes Sháhábád, about 1770 A.D., as 'of considerable circuit, and nearly in the middle is a palace of brick strengthened with towers like a fortress (the Bari Deorhi constructed by Diler Khán), with a vestibule and spacious covered colonnade. Most of the houses are of brick, and there is a fine mosque built of the same material, and enclosed by a wall. The town extends a mile from north to south, its breadth is something less, but of its flourishing state little remains.' When visited by Tennant in 1799, it was an expanse of ruins, 'that appeared in the form, of hills, and broken, crumbling to dust.' Heber found it in 1824 'a considerable town, or almost city, with the remains of fortifications and many large houses.'

The following account of Sháhábád in 1850 is quoted from Sir W. Sleeman's *Tour through Oudh*, vol. ii pp. 46, 47. It is interesting as giving the origin of the chronic ill feeling that exists between the Muhammadans and Hindus, which broke out into a riot at the *Muharram* festival of 1868:—'Sháhábád is a very ancient and large town, occupied chiefly by Pathán Musalmáns, who are a very turbulent and fanatical set of fellows. Subsukh Rái, a Hindu, and the most respectable merchant in the District, resided here, and for some time consented to officiate as the deputy of poor old Háfiz Abdullá for the management of the town, where his influence was great. He had lent a good deal of money to the heads of some of the Pathán families of the town; but finding few of them disposed to repay, he was last year obliged to refuse

further loans. They determined to take advantage of the coming *Muharram* festival to revenge the affront, as men commonly do who live among such a fanatical community. The *tazias* are commonly taken up and carried in procession ten days after the new moon is first seen at any place where they are made; but in Oudh, all go by the day in which the moon is seen from the capital of Lucknow. As soon as she is seen at Lucknow, the king issues an order throughout his dominions for the *tazias* to be taken in procession ten days after. The moon was this year (1850), in November, first seen on the 30th of the month at Lucknow; but at Sháhábád, where the sky is generally clearer, she had been seen on the 29th. The men to whom Subsukh Rái had refused further loans determined to take advantage of this incident to wreak their vengeance; and when the deputy promulgated the king's order for the *tazias* to be taken in procession ten days after the 30th, they instigated all the Muhammadans of the town to insist upon taking them out ten days after the 29th, and persuaded them that the order had been fabricated or altered by the malice of their Hindu deputy to insult their religious feelings. The *tazias* were taken out accordingly; and having to pass the house of Subsukh Rái, when their excitement or spirit of religious fervour had reached the highest pitch, they there put them down, broke open the doors, entered in a crowd, and plundered it of all the property they could find, amounting to about 70,000 rupees. Subsukh Rái was obliged to get out with his family at a back door, and run for his life. He went to Sháhjánpur, in our territory, and put himself under the protection of the Magistrate. Not content with all this, the Muhammadans built a small miniature mosque at the door with some loose bricks, so that no one could go either out or in without the risk of knocking it down, or so injuring this mock mosque as to rouse, or enable the evil-minded to rouse, the whole Muhammadan population against the offender. Poor Subsukh Rái has been utterly ruined, and ever since seeking in vain for redress. The Government is neither disposed nor able to afford it, and the poor boy who has now succeeded his learned father in the contract is helpless. The little mock mosque of uncemented bricks still stands as a monument of the insolence of the Muhammadan population, and the weakness and apathy of the Oudh Government.'

Sháhábád.—Town in Piplí *tahsil*, Ambála (Umballa) District, Punjab; situated in lat. 30° 10' N., and long. 76° 55', on the Grand Trunk road, 16 miles south of Ambála town. Population (1881) 10,218, namely, males 5091, and females 5127. Muhammadans, 5961; Hindus, 3600; Sikhs, 652; and Jains, 5. Number of houses, 1049. Municipal income (1883-84), £520, or an average of 1s. 0½d. per head. Founded by one of the followers of Alá-ud-dín Ghorí about 1086 A.D. The town is well built of brick, and ornamented by several

handsome mansions of Sikh *sardars*. Important Sikh family, descended from Karm Singh, immigrated hither in 1759. Government resumed half the estate on failure of heirs in 1863; the remainder passed to two cousins, representatives of another branch of the family. Inhabitants principally engaged in agriculture; no manufactures; local grain trade.

Sháhábád.—Town in Rámpur State, North-Western Provinces; situated on the south bank of the Rámangá, in lat. $28^{\circ} 33' 30''$ N. and long. $79^{\circ} 4'$ E. Population (1881) 8200, namely, Muhammadans 4987, and Hindus 3213. The town is built on rising ground, and is considered the healthiest place in the State. The Nawáb has a summer residence in Sháhábád, built on the ruins of an old mud fort; it is about 100 feet higher than the surrounding country, and commands a fine view for miles around. Several old Pathán families live here.

Sháhábád.—Town in Kashmir (Cashmere) State, Northern India. Lat. $33^{\circ} 32'$ N., long. $75^{\circ} 16'$ E. Thornton says that it was a favourite residence of the early Mughal Emperors, but has been suffered to fall into decay. Stands in the midst of a fruitful and picturesque valley, famous for producing the finest wheat in Kashmir. *Bázár*, with a few shops. Elevation above sea-level, 5600 feet.

Sháhábázár.—Town in Dhárwár District, Bombay Presidency. Population (1872) 6268; not separately returned in the Census Report of 1881.

Sháháda.—Sub-division of Khándesh District, Bombay Presidency. Area, 479 square miles. Population (1881) 64,368, namely, males 32,717, and females 31,651, occupying 9075 houses, in 2 towns and 149 villages. Hindus number 44,018; Muhammadans, 2738; and 'others,' 17,612. Although the Sub-division possesses two perennial streams, the Tápti forming the southern boundary for a distance of 27 miles, and its tributary the Gomí, it is on the whole scantily provided with surface water. The prevailing soil is a rich loam resting on a yellowish subsoil. In 1863-64, the year of settlement, 4475 holdings (*khálds*) were recorded, with an average of 23.44 acres each, and paying an average assessment of £4, 2s. 0½d. The area under actual cultivation in 1878-79 was 112,379 acres. Cereal and millets occupied 80,293 acres; pulses, 10,465 acres; oil-seeds, 9938 acres; fibres, 9957 acres; and miscellaneous crops, 1726 acres. In 1883 the Sub-division contained 2 criminal courts; police circle (*thánda*), 1; regular police, 49 men; village watch (*chaukidárs*), 185. Land revenue, £24,497.

This region in 1370 formed part of the kingdom of Gujarat, and was invaded and laid waste by Malik Rájá, the founder of a dynasty in Khándesh. Subsequently it passed to the Mughals; and afterwards to the Maráthás. In 1818 it came under British rule.

Sháháda.—Chief town of the Sháháda Sub-division, Khándesh

District, Bombay Presidency; situated 48 miles north-west of Dhulia. Together with Kukdel, it contained in 1881 a population of 5441. Hindus numbered 3675; Muhammadans, 1192; Jains, 35; and 'others,' 539. Municipality, with an income in 1883-84 of £288; incidence of taxation, 11d. Dispensary; post-office.

Sháhápúr.—Sub-division of Thána District, Bombay Presidency. Area, 870 square miles. Population (1881) 107,729, namely, males 55,412, and females 52,317; occupying 18,630 houses in 273 villages. Hindus number 104,959; Muhammadans, 2486; and 'others,' 284. Sháhápúr includes the petty division of Mokháda, and was formerly known as Rolvan. It is a strip of country 50 miles long and 5 to 30 miles broad, stretching in the east of the District below the Sahyádris. The country is, for the most part, wild, broken by hills and covered with large forests. The open parts are in the south, where there are wide tracts of rice lands. The soil is mostly red and stony. In 1879-80, 8880 holdings were recorded with an average area of 26½ acres each, paying an average Government assessment of £1, 7s. 11d. In 1880-81, the actual area under cultivation was 98,226 acres. Cereals and millets occupied 75,519 acres; pulses, 14,364 acres; oil-seeds, 8382 acres; fibres, 330 acres; and miscellaneous crops, 54 acres. In 1883 the Sub-division contained 4 criminal courts; police circles (*thánds*), 3; regular police, 85 men. Land revenue, £11,727.

Sháhápúr.—Chief town of Sháhápúr Sub-division, Thána District, Bombay Presidency; situated on the Agra road about 54 miles north-east of Bombay, and about 1¼ miles from the Great Indian Peninsula Railway. The town stands on the Bhádangi stream, a feeder of the Bháta river, and about 5 miles from the foot of Mahuli fort. Population (1881) 2124, namely, Hindus, 1923; Muhammadans, 192; Pársis, 5; and Christians, 4. Head-quarters of a *mamlútdár*; contains the usual public offices; school and dispensary. A fair, attended by upwards of 3000 people, is held on the great night of the *Maháshivrátí* festival in February; and a second and larger fair takes place about a fortnight afterwards at the *Holi* full-moon (March-April).

Sháhápúr.—Town in Sámglí, one of the southern Maráthá States, Bombay Presidency. Lat. 15° 50' 5" N., long. 74° 33' 56" E. Population (1881) 10,732, namely, males 5415, and females 5317. Hindus number 9269; Muhammadans, 994; Jains, 378; and Christians, 91. Sháhápúr is the most important trading place in Sámglí State. The Population is chiefly composed of bankers, traders, and weavers. Silk-dyeing is carried on to a great extent. The town is governed by a municipal body. Dispensary and school.

Sháhára.—Town and municipality in Khandwá *taluk*, Nímár District, Central Provinces. Population (1881) 2266, namely, Hindus

1923, and Muhammadans 343. Municipal income (1882-83), £57; average incidence of taxation, 6d. per head.

Sháhbandar.—Sub-division of Karáchi District, Sind, Bombay Presidency; lying between 23° 35' and 25° N. lat., and between 67° 20' and 68° 48' E. long. Area, 3378 square miles. Population (1881) 117,362, namely, males 64,841, and females 52,521; occupying 22,651 houses, in 1 town and 360 villages. Hindus numbered 12,205; Muhammadans, 103,450; Sikhs, 972; non-Hindu aborigines, 729; and Christians, 6.

Sháhbandar consists mainly of a flat, alluvial plain, forming part of the delta of the Indus, and cut up by numerous creeks, the chief of which are the Kori channel (which is believed to have been formerly a mouth of the Eastern Nárd), and the Pinyári or Sir river. Large tracts are covered with mangrove and tamarisk jungle. The south-western portion is annually inundated, and the belt bordering the sea affords excellent grazing ground for large herds of buffaloes. Number of canals in Sháhbandar, 152, with an aggregate length of about 800 miles. Government forests, 13, with an area of 38,287 acres. Game and fish abound. The principal crops are rice, occupying 76 per cent. of the total cultivated area, and *báyra*, 13 per cent. The average yield per acre of cleaned rice on good land is about 560 lbs. Wheat, cotton, tobacco, and sugar-cane are also grown. In 1882-83, the area assessed to land revenue was 257,662 acres, and the area under actual cultivation, 115,953 acres. The total area held in *jágír*, or revenue-free, is estimated at 45,000 acres. The annual value of the imports, which are principally cloth, grain, drugs, oil, *ghí*, sugar, tobacco, pepper, areca-nut, and copper and brass vessels, is estimated at about £35,000; and the exports, mainly agricultural produce, at £70,000. The manufactures comprise salt, coarse blankets, and leathern and iron goods. Fairs, 13. Aggregate length of roads, 350 miles; number of ferries, 34.

In 1881-82, the total revenue of Sháhbandar Sub-division amounted to £29,626, of which £27,028 was derived from imperial and £2598 from local sources. The chief items are the land-tax, *abkári* or excise, and stamp duties. Total number of police, 136. Subordinate civil court at Mirpur Batoro. Criminal courts, 8. Police circles (*thánds*), 19. Municipal town, 1, namely, Mirpur Batoro. Sub-ordinate jails at Mirpur Batoro and Sujáwál. Number of schools, 6, with a total of 224 pupils. Prevalent diseases, intermittent fevers. Dispensary at Mirpur Batoro.

Sháhbandar.—*Taluk* of the Sháhbandar Sub-division, Karáchi District, Sind, Bombay Presidency. Area, 1388 square miles. Population (1881) 27,814, namely, males 15,327, and females 12,847; occupying 5593 houses, in 107 villages. Hindus number 2739;

Muhammadans, 24,694; Sikhs, 192; and non-Hindu aborigines, 189. In 1882-83, the area assessed to land revenue was 75,610 acres; and the area under actual cultivation, 33,568 acres. Revenue, £7518. The *táluk* contains 2 criminal courts; police circles (*thánás*), 4; regular police, 27 men.

Sháhbándar (*King's Port*).—Chief town of Sháhbándar *táluk*, Sháhbándar Sub-division, Karáchi District, Sind, Bombay Presidency; situated in lat. $24^{\circ} 10' N.$, and long. $67^{\circ} 56' E.$, in the delta of the Indus, 30 miles south-west of Mugalbhun, and 33 miles south of Sujáwál. Population (1881) less than 2000. Sháhbándar stood formerly on the east bank of the Malir, one of the mouths of the Indus, but it is at present 10 miles distant from the nearest point of the river. The great salt waste commences about a mile to the south-east of the town, and on its westward side are extensive jungles of long *bin* grass. It was to Sháhbándar that the English factory was removed from Aurangábád when the latter place was deserted by the Indus; and previous to the abandonment of the factory in 1775, it supported an establishment of 14 vessels for the navigation of the river. The disastrous flood which occurred about 1819 caused material changes in the lower part of the Indus, and hastened the decay of Sháhbándar, which is now an insignificant village. Carless states that the native rulers of Sind had a fleet of 15 ships stationed here. Vessels entered by the Richal, the only accessible mouth, and passing into the Hajámro through what is now the Khedewári creek, ascended that stream to about 10 miles above Ghorebári, where it joined the Malir. Sháhbándar is the head-quarters of a *múkhltídrkár* and of a *táppádr*; police *thánd* or circle, with a force of 13 men.

Sháhbáznagar.—Large village in Sháhjáhánpur *tahsíl*, Sháhjáhánpur District, North-Western Provinces; situated in lat. $27^{\circ} 56' 5'' N.$, and long. $79^{\circ} 55' 6'' E.$, on the river Garra, 3 miles from Sháhjáhánpur town, of which it may be said to form a suburb. Population (1881) 3259. The town is named after its founder, Sháhbáz Khán, who settled here and built a fort about the same time as the foundation of Sháhjáhánpur town in the middle of the 17th century. His descendants remained in possession up to the time of the Mutiny, when the estate was confiscated for rebellion, and bestowed upon Maulvi Shaikh Khair-ud-dín, Deputy Collector at Bareilly.

Sháhbázipur.—Village in Kalyánpur *tahsíl*, Fatehpur District, North-Western Provinces; situated in lat. $25^{\circ} 55' 40'' N.$, long. $80^{\circ} 39' 35'' E.$, 7 miles from Bindki, and 13 miles from Fatehpur town. Population (1881) 1203, chiefly Kurmis and Baniyás. Police outpost station. Good market.

Sháhdádpur.—*Táluk* of the Upper Sind Frontier District, Sind, Bombay Presidency. This *táluk* was until recently a part of Lárkhána

Sub-division, and was formed out of parts of Sujáwál, Rato Dero, and Kambár *táluk*. In 1883 the *táluk* contained 2 criminal courts; police circle (*thánda*), 1; regular police, 19 men. Revenue, £8054.

Sháhdádpur.—*Táluk* of the Hála Sub-division, Haidarábád (Hyderábád) District, Sind, Bombay Presidency. Area, 733 square miles. Population (1881) 55,593, namely, males 30,293, and females 25,300; occupying 8316 houses, in 1 town and 111 villages. Hindus number 6801; Muhammadans, 43,658; Sikhs, 2915; and non-Hindu aborigines, 2219. In 1882-83, the area assessed to land revenue was 53,969 acres; and the area under actual cultivation, 48,074 acres. In 1883 the *táluk* contained 3 criminal courts; police circles (*thánds*), 7; regular police, 31 men. Revenue, £1386.

Sháhdádpur.—Chief town of Sháhdádpur *táluk*, Haidarábád District, Sind, Bombay Presidency; situated in lat. 25° 56' N., and long. 68° 40' E., on the Jámwah Canal, 15 miles north-east of Hála, and 40 miles north-east of Haidarábád city. Population (1881) 2068. Seat of a *múkhhtárkár's* office, with the usual public buildings. Local trade in grain, oil-seeds, sugar, and cloth, valued at £6000; transit trade in *bájra*, wheat, rice, and cotton, valued at about £10,000. Chief manufacture, oil. Sháhdádpur is said to have been founded two centuries ago by one Mír Sháhdád.

Sháhdara.—Village in Lahore District, Punjab; situated in lat. 31° 40' N., and long. 74° 20' E., on the west bank of the Ravi, nearly opposite Lahore city, from which it is distant about 6 miles. Population (1881) 3847. Contains the mausoleum of the Emperor Jahángir and his wife Núr Jahán, and the tomb of Asaf Khán, brother of the empress, in a beautiful garden, a favourite resort of the residents of Lahore. The Sikhs committed great depredations upon all the buildings, carrying off much of the marble facings and enamelled work to decorate their own temple at Amritsar (Umrítur). Sháhdara is the second station from Lahore on the Punjab Northern State Railway.

Sháhdara.—Town and municipality in Ghaziábád *tahsil*, Meerut (Merath) District, North-Western Provinces, situated in lat. 28° 40' 5" N., and long. 77° 20' 10" E., near the left bank of the Eastern Jumna Canal, about 31 miles south-west of Meerut city, and a station on the Sind, Punjab, and Delhi Railway. The town was founded by the Emperor Sháh Jahán, who gave it its present name of 'Royal Gate,' and designed it as an emporium for the supply of grain to his troops. Sacked by Suráj Mall Ját, of Bhartpur, and plundered by the soldiers of Ahmad Sháh Durani just before the battle of Panipat. Population (1881) 6552, namely, Hindus, 4853; Muhammadans, 1505; Jains, 132; and Christians, 62. Municipal income (1883-84), £210. Manufacture of sweetmeats. Large trade in shoes and leather; important

sugar refineries. Police station, post-office, and handsome new *sardī* or native inn.

Sháh Dheri.—Village and ruins in Ráwal Pindi District, Punjab.—*See* DERI SHAHAN.

Sháhganj.—Town in Khutáhan *tahsíl*, Jaunpur District, North-Western Provinces; situated in lat. $26^{\circ} 2' 42''$ N., long. $82^{\circ} 43' 36''$ E., on the metalled road to Faizábád, 8 miles north-east of Khutáhan town. The town owes its origin to the Nawáb Wazír of Oudh, Shuja-ud-daulá, who built a market-place, a *báradarí*, and a *dargah* or tomb in honour of the famous Mecca saint, Sháh Hazrat Ali. Population (1881) 6317, namely, Hindus 4708, and Muhammadans 1609. At the commencement of British rule, Sháhganj was, and still remains, a thriving mart, second only to Jaunpur in commercial importance. Large centre of cotton trade, with markets on Tuesdays and Saturdays. School, post-office, police station, dispensary, and station on the Oudh and Rohilkhand Railway. A house-tax is levied for police and conservancy purposes, realizing £208 in 1882–83.

Sháhganj (or *Mukimpur*).—Town in Faizábád (Fyzábád) District, Oudh; situated about 10 miles from Faizábád town. Founded by a Mughal on the village land of Mukimpur; seized by Rájá Darshan Singh, whose fort and residence became celebrated during the Mutiny of 1857. Population (1881) 3191, namely, 2622 Hindus and 569 Muhammadans. Mosque, 2 temples, and vernacular school.

Sháhgarh.—Chief town of a tract bearing the same name in Bandá *tahsíl*, Sagar (Saugor) District, Central Provinces; situated in lat. $24^{\circ} 19'$ N., and long. 79° E., 40 miles north-east of Sagar town. Originally part of the Gond kingdom of Mándlá, it continued till 1857 to be the head-quarters of an independent chief of ancient lineage. Population (1881) 2155, namely, Hindus, 1747; Muhammadans, 241; Kabírpanthis, 43; Jains, 123; and 'other,' 1. Sháhgarh stands at the foot of a lofty hill range, with jungle on nearly every side. The small fort, now in ruins, on the east of the village, contained the Rájá's palace. At the villages of Báretá, Amarmau, Hirápúr, and Tigorá, all in the north of the tract, iron-ore is smelted and sent to Cawnpur. Markets are held every Tuesday and Saturday; Government boys' school, girls' school, and dispensary.

Sháhi.—Canal in Gurdáspur, Amritsar, and Lahore Districts, Punjab.—*See* HASLI.

Shahiwal.—Town in Sháhpur *tahsíl*, Sháhpur District, Punjab.—*See* SAHIWAL.

Sháhjahánpur.—A British District in the Lieutenant-Governorship of the North-Western Provinces, lying between $27^{\circ} 35'$ and $28^{\circ} 28' 15''$ N. lat., and between $79^{\circ} 23'$ and $80^{\circ} 25' 45''$ E. long. Area (1881), 1745 square miles. Population, 856,916 souls. Sháhjahánpur forms

the easternmost District of the Rohilkhand Division. It is bounded on the north-west and north by Pilibhūt and Bareilly (Bareli) Districts; on the east by the Oudh District of Kheri; on the south by Hardoi District, and by the Ganges, which separates it from Farukhábád District; and on the west by Budáun and Bareilly Districts. The administrative head-quarters are at the city of SHAHJAHANPUR.

Physical Aspects.—The District of Sháhjahánpur consists of a long narrow tract, running upward from the Ganges in the south-west towards the Himálayas, reaching to within 3 miles of the Sardá river on the north-east, nearly at right angles to the river system of the Rohilkhand plain. Hence its natural features depend almost entirely upon the various streams which have cut themselves deep channels through the alluvial soil of the Gangetic basin. The north-eastern corner, beyond the Gúm̐ti, presents an appearance not unlike that of the *taráí* or damp submontane belt. A large area still remains under forest, or lies otherwise waste. A scanty population inhabits this malarious tract; but water rises close to the surface, and the natural fertility of the soil is only marred by the feverish exhalations.

The next section, between the Gúm̐ti and the Khanaut, passes from a rather wild and unhealthy northern region to a densely inhabited strip along the southern river, consisting of a productive loam, well cultivated with sugar-cane and other remunerative crops. The Khanaut falls into the Deoha or Garra just below Sháhjahánpur city; and the triangle enclosed between the confluent streams, though fertile in the immediate neighbourhood of their valleys, consists of a thinly peopled country, overgrown with thorn and *dhák* jungle.

The section between the Deoha and the Gardí comprises much marshy land; but south of the latter river, the country rises in a sandy ridge, till it reaches the valley of the Rám̐ganga, through which the stream wanders in changing courses, destroying and re-forming its banks with great rapidity. Thence to the Ganges stretches a continuous lowland, consisting of marshy patches alternating with a stiff clay soil, and requiring irrigation in parts. This is supplied by the Sot and other streams, which are utilized by being dammed up at particular places, and the water thus stored is distributed in channels, often to great distances. Cultivation is here less easy and less remunerative. In the bed of the Ganges, at the extreme south of the District, are lowlands covered with high grass and brushwood.

The Rám̐ganga and the Deoha or Garra change their channels in a most arbitrary manner; the Rám̐ganga to an extent perhaps unparalleled in the case of any river of equal volume. Each rapidly replaces the land destroyed by fresh alluvial deposits; and there are thus two broad lines of rich soil crossing the District. These tracts of alluvial deposit, alternating with hard clay, occupy, with the great sandy ridge

that lies between the valleys of the Rámangá and Deoha, the whole southern and central parts of the District. The northern part may be roughly divided into two tracts—(1) the moist *tardí*-like tract comprising Khutár *parganá* and the northern part of Pawáyan; and (2) the rich sugar-producing country about Pawáyan and Barágáon. There are in each tract minor variations, narrow ridges of light soil above the smaller rivers and streams, or small tracts of hard soil in depressions near the larger *jhils* or lakes.

The Rámangá forms the main waterway of the District, being navigable as far as Kola Ghát, near Jalálábád, whence considerable quantities of cereals and pulses are shipped in country boats, by Cawnpur traders for the Ganges ports. A few swampy lakes (*jhils*) in the lower portions of the District afford irrigation for the spring crops in their neighbourhood. No large pasture-grounds exist anywhere, but cattle are sent in large herds from the northern *parganá*s to graze, in Nepál during the cold weather, returning at the commencement of the rains.

Khutár *parganá*, in the north of the District, contains a wide area of still unreclaimed jungle, consisting chiefly of *sál*, but not now containing any large trees. The jungles are, however, of great value, as furnishing large quantities of timber for house-building purposes. Two smaller tracts of the same description of jungle exist in Pawáyan *parganá*—one on the river Gúmti, and one on the Khanaut; but in the rest of the District, the jungle consists simply of dwarf *dhák* and thorn bushes, and is almost confined to the hardest and poorest soil in Nigohi, Jalálábád, and Jamaur *parganá*s. The total of this unreclaimed area, consisting of forest, *dhák* jungle, open grass land, etc., amounted at the time of the land settlement to 226½ square miles, or 17 per cent. of the whole District area. The only mineral product of Sháhjahánpur is *kankar*, or nodular limestone, either burnt into lime, or used in its raw state for road metalling.

Fera Naturæ.—Leopards are not uncommon in the jungle tracts in the north of the District; and a wandering tiger or lynx is occasionally shot. Spotted deer frequent the northern jungle, and *nílgaí* and wild hog are found in small numbers in the patches of *dhák* scrub scattered about the District. The antelope is met with in small numbers almost everywhere, and in large herds on the highlands near the Gúmti, and in the valley of the Ganges. Smaller game comprises florken, hare, black and grey partridge, quail, sand-grouse, and pea-fowl, found almost everywhere. The large ponds and marshes abound in water-fowl of all sorts; and several kinds of geese, ducks, teal, and snipe afford excellent sport for about four months during the cold season.

History.—Sháhjahánpur possesses little separate history of its own

before its annexation by the British in 1801. During the early Musalmán times, it always formed part of Kather proper, or the country of the Katheriya Rájputs, nearly the whole of its *pargands* lying east of the Rámangá ; and it was then included under the government of Budáun. Sháhjahánpur town was founded in the reign of Sháh Jahán by Nawáb Bahádur Khán, a Pathán, who named it in honour of the Emperor. About 1720, Alí Muhammad Khán, who had risen into power at the head of his Rohillá clansmen, defeated the Governors of Bareilly (Bareli) and Morádábád, and himself assumed the rule of those two Districts, together with Sháhjahánpur. On his death in 1751, Háfiz Rahmat Khán, the guardian of his sons, became leader of the Rohillás, and defeated the imperial troops sent against him. Sháhjahánpur remained under the Bareilly authorities till 1774, when the Nawáb Wazír of Oudh overran Rohilkhand with the aid of Warren Hastings. The Rohillás, however, had never gained complete control over the eastern portion of Sháhjahánpur District, though their power was firmly established in the west. The Gaur or Katheriya Thákurs also retained their independence among the wild wastes of the north. Sháhjahánpur, indeed, lying on the border between Oudh and Rohilkhand, formed a sort of debateable land between the two Provinces ; but the sympathies and connections of the Sháhjahánpur Patháns lay always with Oudh rather than with the Rohillás. The Nawáb Wazírs held Rohilkhand from 1774 till 1801, when it was ceded to the English by the treaty of Lucknow.

Thenceforward, our rule was never disturbed until the Mutiny, although the District bordered upon the most turbulent part of Oudh. In 1857, however, Sháhjahánpur became the scene of open rebellion. The news of the Meerut (Merath) outbreak arrived on the 15th of May ; but all remained quiet till the 25th, when the sepoy informed their officers that the mob intended to plunder the treasury. Precautions were taken against such an attempt ; but on the 31st, while most of the officers, civil and military, were at church, some of the sepoy forced their way into the building and attacked them. Three Europeans were shot down at once ; the remainder closed the doors, and aided by their servants, together with a hundred faithful sepoy, held the church against the mutineers. The other officers then joined them, and the whole party escaped, first to Pawayan, and afterwards to Muhamdi. The mutineers burnt the station, plundered the treasury, and made their way to the centre of local disaffection at Bareilly.

A rebel Government, under Kadir Alí Khán, was proclaimed on the 1st of June. On the 18th, Ghulam Kádír Khán, the hereditary Nawáb of Sháhjahánpur, passed through on his way to Bareilly, where he was appointed Názim of Sháhjahánpur by Khán Bahádur Khán. On the 23rd the Nawab returned to his titular post, and superseded Kádír

Alf. He remained in power from June 1857 till January 1858, when our troops reoccupied Fatehgarh. The Nawáb of Fatehgarh and Firoz Sháh then fled to Sháhjahánpur, and on to Bareilly. After the fall of Lucknow, the Nána Sáhib also fled to Sháhjahánpur, but remained only ten days, and proceeded onward to Bareilly. In January, the Nawáb put to death Hámid Hassan Khán, Deputy Collector, and Muhammad Hassan, subordinate judge, for corresponding with the English. On the 30th of April 1858, the British force under Lord Clyde reached Sháhjahánpur. The rebels fled to Muhamdi, and the British went on to Bareilly on the 2nd of May, leaving only a small detachment to guard the station. The rebels then assembled once more, and besieged our troops for nine days; but Brigadier Jones' column relieved them on the 12th, and authority was then finally re-established.

Population.—The Census of 1853 returned the number of inhabitants at 986,096 persons. That of 1865 showed a total of 1,018,117, being an increase of 32,021 persons, or 3·2 per cent. The Census of 1872 gave the population as 951,006, showing a further decrease of 67,111 persons, or 6·6 per cent., since 1866; and of 35,090 persons, or 3·5 per cent., in the whole nineteen years. These returns yield, however, fallacious inferences, if compared with the area, which increased by 20 square miles in the first twelve years, and decreased by 605 square miles, or 35·1 per cent., in the seven years from 1865 to 1872, owing to the transfer of Purnapur *parganá* to Pilibhít District. The real rate of increase may best be seen from the figures representing the density of population, which amounted to 427 persons per square mile in 1853, 437 in 1865, and 549 in 1872. It must be borne in mind that the *parganá* transferred to Pilibhít between 1865 and 1872, lying close to the foot of the Himálayas in the pestilential *tardi*, had a much sparser population than any other portion of the District.

At the last Census in 1881, the population was returned at 856,946, showing a real decrease of 94,060, or 9·9 per cent., since 1872. This decrease is wholly due to the effects of the famine of 1877-78, in which Sháhjahánpur suffered terribly, the mortality from starvation, or diseases caused by privation, being estimated at not less than 150,000. For details of this famine, see the section of this article, *post*, on Natural Calamities.

The results of the Census of 1881 may be briefly summarized as follows:—Area of District, 1745·7 square miles; number of towns 6, and of villages 2020; houses, 123,640. Average density of population, 491 persons per square mile; towns or villages per square mile, 1·16; persons per town or village, 423; houses per square mile, 70·8; inmates per house, 6·9. Total population 856,946, namely, males 460,064, and females 396,882; proportion of males, 53·6 per

cent. The excessive proportion of males is doubtless due to the former prevalence of female infanticide; but the Infanticide Act has been put in force in certain villages of the District, and is working well for the suppression of the practice. In 1881, in five clans of Rájputs, Ahírs, Ahars, Gújars, and Játs, suspected of infanticide and proclaimed as such to the number of 129,886, the proportion of females was as low as 43·2 per cent. That the Act is working satisfactorily is proved by the fact that of 30,461 children under ten years of age belonging to the above tribes, females numbered 14,259, or 46·7 per cent. Classified according to sex and age, Sháhjahánpur contained in 1881—under 15 years of age, boys 173,119, and girls 143,393; total children, 316,512, or 36·9 per cent. of the population: 15 years and upwards, males 286,945, and females 253,489; total adults, 540,434, or 63·1 per cent.

Religion.—As regards religious distinctions, the population is classified as follows.—Hindus, 735,244, or 85·8 per cent. of the District population; Muhammadans, 120,214; Christians, 1408; Sikhs, 78; and Pársis, 2. Of higher caste Hindus, Bráhmans number 59,366; Rájputs, 60,398; Gosains, 2616; Bháts, 1680; Banijás, 22,864; and Káyasths, 11,282. The lower or Súdra castes, who form the bulk of the population, include the following:—Kúrmí, the principal agricultural class, and most numerous caste in the District, 103,958; Chamár, 85,481; Kachhí, 59,058; Ahír, 65,216; Kahár, 34,965; Kori, 22,771; Telí, 21,943; Dhobí, 17,232; Pasí, 17,186; Gadariá, 16,662; Barháí, 16,067; Bhurjí, 14,361; Náí, 14,334; Dhanuk, 11,633; Lohár, 10,069; Kumbháí, 8993; Bhangí, 7228; Kalwár, 6915; Sonár, 5185; Gújar, 3163; Loniya, 2877; Lodhí, 2413, Kathuk, 2221; Tambuli, 1940; and Málí, 1845.

Of the Muhammadans, only 181 are recorded as Shiás by sect in the Census Report, the remainder being all Sunnis. Classified by race, as distinguished from religion, the Musalmáns consist of three classes—*Milkís*, so called because their ancestors were the class to whom principally *milk*s or revenue-free grants of lands were given by the Muhammadan rulers of the country. They are sub-divided into Sayyids and Shaikhs, and are reputed to be the descendants of Arabs. The Patháns or Afgháns, and the Mughals, are descended from immigrants into India from beyond the north-west. The Indian Muhammadans, or descendants of converts from Hinduism, include 677 Rájputs and Mowatís by descent. In the *khaddr* of the Ganges, in Jalálábad *taluk*, a peculiar class of Musalmáns called Panthias are found in small isolated hamlets. These profess to be strict Muhammadans, but transgress the law of Islám by eating turtles, crocodiles, and other animals usually regarded as forbidden food. They appear to be a fairly well-to-do cultivating class, and their hamlets

show a stock of cattle, goats, and poultry much larger than that possessed by ordinary Hindu cultivators.

The Christian population consists of—Europeans, 942; Eurasians, 6; and natives, 460. The different sects include the Churches of England and Rome, Presbyterians, Baptists, Methodists, and Wesleyans. The American Baptist Mission has had a station at Sháhjahánpur since 1859, with several schools for boys and girls in the city, one teaching up to the university entrance standard. There is also a Christian village at Panápur, 10 miles east of the city, connected with a boys' orphanage under charge of the Mission, comprising about 900 acres of land laid out in small farms and cultivated by about 300 native Christians. The children of the orphanage are fed, clothed, educated, and instructed in various trades by the Mission, which receives a Government grant-in-aid of £25 a month. The Mission altogether maintains 26 day schools in the District, 18 for girls, and 8 for boys, attended in 1882 by 303 girls and 627 boys.

Urban and Rural Population.—Sháhjahánpur contains six towns with more than five thousand inhabitants, namely, SHAHJAHANPUR, population (1881) 74,830; TILHAR, 15,351; JALALABAD, 8025; KHUDAGANJ, 6925; MIRANPUR KATRA, 5949; and PAWAYAN, 5478. The urban population thus disclosed amounts to 116,558, or 13·6 per cent. of the District population, leaving 740,388, or 86·40 per cent., as forming the rural population. The only two municipal towns, however, are Sháhjahánpur and Tilhár. Total municipal income (1883-84), £7316, of which £5818 was derived from taxation in the shape of octroi duties; average incidence of taxation, 1s. 3d. per head of the population (92,963) within municipal limits. The police and conservancy arrangements of the other towns is provided for by a small house-tax levied under the provisions of Act xv. of 1856. Of the 2020 minor villages, 829 contain less than two hundred inhabitants; 754 between two hundred and five hundred; 322 between five hundred and a thousand; 97 between one thousand and two thousand; 13 between two thousand and three thousand; and five between three thousand and five thousand.

Material Condition of the People.—In the central portion of the District, the people are well off, and inhabit a richly cultivated plain, scarcely inferior to that of the Doáb. In the extreme north, however, agriculture is backward, waste tracts are numerous, and the people are poor and miserable like their neighbours in the *taráí*. In the south, also, where the swampy tract between the Ramganga and the Ganges alternates with stretches of stiff clay, the condition of the agricultural classes is much less prosperous. The best class of houses in towns rarely cost more than £200; the common huts of the peasantry, about £1. The latter consist merely of mud walls roofed with thatch.

As regards occupation, the Census Report of 1881 distributes the total male population among six great classes. The first or professional class numbers 7803, including 4372 engaged in the general government, 1228 in military defence, and 2203 in the learned professions or in literature. The second or domestic class numbers 1931, and comprises all males employed as private servants, washermen, water-carriers, barbers, sweepers, innkeepers, etc. The third or commercial class numbers 7588, and includes all persons who buy or sell, or keep or lend money or goods, such as bankers, money-lenders, brokers, shopkeepers, etc., 2338; and persons engaged in the carriage of men or goods, such as pack-carriers, carters, etc., 5250. Of the fourth or agricultural class, besides the 225,509 males engaged in agriculture, the Census returns show 1270 persons engaged about animals, such as shepherds, etc., making a total of 226,779. The fifth or industrial class numbers 41,030, including all persons engaged in industrial arts and mechanics, such as dyers, masons, carpenters, perfumers, etc., 3016; those engaged in textile manufactures, such as weavers, tailors, cotton-cleaners, etc., 18,456; preparers of articles of food or drink, such as grain-parchers, confectioners, cooks, etc., 9840; and dealers in all animal, vegetable, or mineral substances, 9718. The sixth or indefinite class numbers 174,933, comprising all general labourers, 21,050; and persons of independent means, male children, and unspecified, 153,883.

Agriculture.—The course of tillage follows the ordinary rule of the North-Western Provinces, consisting of the *kharif* or autumn harvest—chief staples, cotton, rice, *bājra*, and *joār*, and the *rabi* or spring harvest, including wheat, barley, oats, vetch, and peas. Sugar-cane is grown in the low-lying lands, and Indian corn on ground capable of bearing two crops a year. Of the total District area of 17457 square miles, 1089.6 square miles were returned in 1883–84 as under cultivation, 463.7 square miles were available for cultivation, 173.5 square miles were uncultivable waste, while 18.9 square miles were non-assessed or held revenue-free. The total crop area in 1883–84 (including lands bearing two harvests in the year) was returned at 730,819 acres, as follows:—*Rabi*—wheat and barley, 290,933 acres; pulses, 44,170 acres; oil-seeds, 516 acres; miscellaneous, 12,194 acres. *Kharif*—rice, 96,241 acres; millets, 152,977 acres, cotton, 2665 acres, oil-seeds, 1582 acres; miscellaneous, 88,578 acres. The crops belonging to neither season were—sugar-cane, 38,509 acres; and vegetables, 2454 acres.

There are no irrigation canals in Sháhjahánpur, nor does there appear any need for them, as the rainfall is copious, and the water level only from 12 to 15 feet below the surface. Irrigation is abundantly furnished by wells, tanks, ponds, and the damming up of the minor rivers and streams. In 1883–84, the area thus irrigated was

returned at 229,807 acres. Manure is employed where obtainable, but the poverty of the cultivators seldom permits them to let their land lie fallow. The land tenures belong to the standard types of the Province. The country, however, has been too recently occupied to have acquired such complicated holdings or undergone such minute sub-division as in the Lower Doáb. The horned cattle of the District are small and weak, and good draught oxen can only be obtained by importation from beyond the Ganges. Government has made several attempts to improve the breed, but the people show no disposition to avail themselves of the facilities offered to them.

Land Tenures, Rent, etc.—At the time of the settlement of the District, out of a total of 3063 revenue-paying estates in Sháhjahánpur, 2191 were held under *zamíndárl*, and 872 under *pattidárl* tenure. The area alienated in perpetuity in rent-free grants of land, made by the *zamíndár* proprietors, amounted to 11,712 acres, or a little over 1 per cent. of the total area. Cultivating tenures are divided into the two primary classes of proprietary and non-proprietary holdings. The fields cultivated by proprietors are called *sír* or homestead lands. The non-proprietary cultivators are either tenants with a right of occupancy, or tenants-at-will. Under the operation of the present rent-law, tenants-at-will are always on the way to acquiring the status of privileged tenants with rights of occupancy; the only qualification necessary being continuous cultivation of the same lands (other than *sír* lands) for twelve years. At the time of settlement, the proprietors held themselves 13·42 per cent. of the cultivated area as *sír* land; occupancy tenants, 61·31 per cent.; and tenants-at-will, 25·27 per cent. One reason for the large proportion of occupancy tenants is said to be the universal prevalence of money rents all over the District, except in the worst parts of Pawáyan and Khutár *pargands*.

The total male adult agricultural population in Sháhjahánpur District in 1881 was returned at 225,509, made up as follows:—Landed proprietors, 8,468; estate servants and agents, 10,47; tenant cultivators, 178,352; and agricultural labourers, 37,642. The population entirely dependent on the soil, however, numbered 622,593, or 72·65 per cent. of that of the whole District. Average area cultivated by each male adult agriculturist, 3·13 acres. Total Government assessment, including local rates and cesses levied upon the land, £139,760, or an average of 4s. per cultivated acre. Rental paid by cultivators, including cesses, £219,868, or an average of 6s. 2½d. per cultivated acre. Custom, rather than competition, has regulated the rates of rent in this District, and the higher rates are still much the same as they were in 1818. The lower rates, however, were enhanced at the time of settlement by an average of 6½ per cent. The following is a statement of the maximum and minimum rates prevailing for each of the six

principal classes of land :—Homestead (*gauhūni*) land, from 7s. 6d. to 16s. an acre; first-class loam (*domat*), from 4s. 6d. to 10s. an acre; second-class loam, from 3s. to 7s. 6d. an acre; clay (*matiyār*), 3s. 6d. to 8s. an acre; sand (*bhūr*), from 2s. 3d. to 5s. an acre; and hard clay (*dhānkar* and *khūpat*), from 2s. 3d. to 5s. an acre. Rates of rent are determined quite as much by the respectability of the tenant as by the quality of the soil, the lowest rates being paid by Bráhmans, Rájputs, and high-class Muhammadans; and the highest by the lower castes of Hindus and inferior orders of Muhammadans.

The following statement of the prices per cwt. of agricultural produce for the three years 1861, 1871, and 1881, which may be regarded as normal years, shows the steady advance in prices which has been made of late years—Wheat, 1861, 3s. 1½d.; 1871, 4s.; and 1881, 5s. 4d. per cwt. Barley, 1861, 2s. 7d.; 1871, 3s. 1½d.; and 1881, 4s. 1d. per cwt. *Bājra*, 1861, 2s. 10½d.; 1871, 3s. 11½d., and 1881, 4s. 7d. per cwt. *Joār*, 1861, 2s. 9d.; 1871, 3s. 11½d.; and 1881, 4s. 3d. per cwt. Common rice, 1861, 4s. 11d.; 1871, 5s. 11d.; and 1881, 7s. 2d. per cwt. Best rice, 1861, 8s. 5d.; 1871, 18s. 8d.; and 1881, 15s. per cwt. Wages have risen in proportion. Coolies and agricultural labourers who were paid from 2d. to 2½d. a day in 1858, received from 3d. to 3½d. in 1882; while the wages of skilled labourers, such as smiths, carpenters, and masons, have risen from 4½d. to 6d. and upwards a day, in the same period.

Natural Calamities.—Sháhjahánpur suffers from drought and famine, though its proximity to the hills sometimes saves it from the worst extremities to which neighbouring Districts are exposed. The great famine of 1783–84, though severely felt in Rohilkhand, did not press so heavily upon this Division as upon Agra and the south-west. In 1803–04, two years after the cession, rain completely failed for the autumn crops. In 1825–26, drought again occurred, but did not bring about famine in the strictest sense. In 1837–38, the autumn rains failed, but a slight fall in February saved the harvest in part, though great dearth of grain ensued. The famine of 1860–61 was severely felt throughout Rohilkhand, and Sháhjahánpur suffered like its neighbours, though it escaped the extreme misery which fell upon the contiguous District of Budáun. In the famine of 1868–69, Sháhjahánpur escaped lightly, although during the period of pressure, lasting for seven weeks, the suffering was extremely severe.

Perhaps the District suffered more severely in the famine of 1877–79 than on any previous occasion in the present century. A series of bad harvests had followed the previous scarcity of 1868–69, and the heavy demands by the beginning of 1877 for the export of grain to Southern India caused such a depletion of stocks, as to convert what would otherwise have been a severe scarcity into actual

finance. On the 7th August 1877, the Collector reported 'roaring hot winds, and not a vestige of green anywhere.' Although a little rain fell towards the end of August, prices of grain had risen beyond the purchasing power of the poorest class early in September; and the *kharrif* or autumn harvest was a total failure. A timely fall of rain, however, early in October enabled the sowings for the *rabi* or spring crops to be made, the requisite seed corn being provided by Government, while small money loans were arranged for from the *malijans* through the *talukdars* in the interior of the District, on the security of the landholders. By December the spring sowings were over, and relief works were started, in the shape of earthwork and the collection of road materials for those able to labour, and a poorhouse for the helpless and infirm, while high-caste women who do not appear in public received assistance in their own homes. But the cultivating classes generally declined to submit to what they deemed the indignity of road-work, and preferred living as best they could on wild pot-herbs (*ajay*), which they could gather in the neighbourhood of their own homes, to earning the wages offered on the works. For artisans and labourers in the city, work was provided by the municipality. The consequence of this entire substitution of green food for the ordinary coarse grains consumed by the peasantry was that their strength failed, and they succumbed in large numbers to the cold at the end of December and beginning of January.

The *rabi* harvest in 1878 was generally fair, notwithstanding some partial loss from hailstorms and superabundance of moisture; and the high prices prevailing did much to recoup the cultivators. But the condition of the day labourers still caused grave anxiety. The autumn rains, although delayed, fell in sufficient abundance to ensure the prospects of the ensuing *kharrif* harvest; and relief works were closed by the middle of November, and the poorhouses by the end of December 1878. The mortality caused by the famine was very heavy; 60,033 deaths are reported to have occurred between November 1877 and October 1878. The after effects of famine, as the deterioration of the strength of the people, were terribly illustrated in the fever epidemic which raged during 1879 and part of 1880. The registered death rate, which stood at 29.37 per thousand in 1877, rose to 57.04 per thousand in 1878, and to 53.33 per thousand in 1879, falling again to 34.32 per thousand in 1880.

Commerce and Trade, &c.—The Oudh and Rohilkhand Railway is the main channel for the commerce of Shahjahanpur. It enters the District near Kalia, and leaves it near Fatehgarh, after a course of 33 miles within its limits. There are stations at Kalia, Keda Jorahat, Shahjahanpur, Titpur, and Manspur Katta. Four main roads lead to the great centres of trade, namely, the Rohilkhand Trunk

Road; the road from Pawāyan through Sháhjahānpur to Jalálábád; from Lucknow to Bareilly *viâ* Sháhjahānpur and Tilhár; and from Fatehgarh through Jalálábád to Miranpur Katra. Total length of roads, 337 miles. Cereals and pulses are carried down the Rámangá by Cawnpur traders, who send their boats to Kolaghát, near Jalálábád. Grain and raw sugar are conveyed on the Deoha from Sháhjahānpur. Some through traffic exists from Pilibhít, where boats are built and despatched down stream, laden with produce. A considerable quantity of timber is also floated down from Pilibhít. Sugar is largely manufactured, and forms the chief export of the District. It formerly went by cart to Agra and other trans-Jumna marts, salt and cotton being imported in return; but most of this traffic now finds an outlet by the railway, which also conveys the cotton from Chandausi, the chief market for that staple in Rohilkhand. European goods, metals, and salt form the main items of import trade. The principal manufacture under European superintendence is that of sugar, started thirty years ago at the Rosa factory, near Sháhjahānpur, by Messrs. Carew & Co. The factory was destroyed during the Mutiny, but was restored, and has been continued ever since. Rum is also distilled here, and largely sold to the Commissariat Department. The works are connected with the Oudh and Rohilkhand Railway by a short branch line $3\frac{1}{2}$ miles long, and are capable of turning out 600,000 gallons of rum, and 120,000 *maunds* of sugar. The still-head duty due to Government on rum sold to the public (exclusive of that supplied to the Commissariat Department) amounts to nearly £30,000 a year.

Administration.—Sháhjahānpur is the seat of a Civil and Sessions Judge, whose civil jurisdiction extends also over the adjoining District of Budáun. He holds criminal sessions at Budáun town alternately with the Judge of Bareilly. The District staff comprises a Collector-Magistrate, Joint Magistrate, Assistant Magistrate, and uncovenanted Deputy Magistrate, besides a sub-deputy opium agent, and the usual fiscal, medical, and constabulary officials. The total amount of revenue—imperial, municipal, and local—raised in the District in 1876 amounted to £191,508, or 3s. 10 $\frac{3}{4}$ d. per head of the population. Of this sum, the land-tax contributed £118,442. In 1883-84, the total revenue of the District amounted to £186,162, of which the principal items were—Land revenue, £118,637; stamps, £13,786; excise, £32,807; provincial rates, £14,149; assessed taxes, £2356; registration, £755. The total cost of civil administration, as represented by the pay of officials and police, in 1883-84, was £31,821. Number of civil judges, 13; number of magistrates, 30. In 1883 the regular and town police force consisted of 648 officers and men, maintained at a total cost of £6635. There is also a village watch or rural police (*chakhtis*) numbering 2081 in

1883, maintained at a cost of £7518. The total machinery, therefore, for the protection of person and property consisted of 2729 officers and men, giving one man to every '6 square mile of area, or to every 314 of the population. Total cost, £14,153, equal to an average of £8, 2s. 1½d. per square mile of area, or 3½d. per head of population. The District jail at Sháhjahánpur contained during the same year a daily average of 320 prisoners, of whom 15 were females. Postal communication is carried on by 9 imperial and 10 local post-offices; and the telegraph is in operation at all the stations on the Oudh and Rohilkhand Railway.

The educational returns in 1883 showed a total of 140 Government aided and inspected schools, with a roll of 4563 pupils. This is exclusive of unaided and uninspected schools. The Census Report of 1881 returned 5922 boys and 136 girls as under instruction, besides 17,080 males and 317 females able to read and write but not under instruction. The schools conducted by the American Baptist Mission have been already alluded to in a previous section of this article.

For fiscal and administrative purposes, the District is sub-divided into 4 *tahsils* and 12 *parganás*.

Medical Aspects.—The climate of Sháhjahánpur is much damper than that of the Upper Doáb, and somewhat more so than the other portions of the Rohilkhand plain. Six weeks seldom pass at any time of the year without a fall of rain; and the prevailing wind sets easterly from the cloudy summits of the Himálayas. The heat during the hot months does not equal that of the neighbouring Districts, and excessively hot winds seldom blow for more than five or six days in each year. Except in May and June, the country has a fresh and green aspect, very unlike the parched brown stretches of the Doáb. The average rainfall for 32 years ending 1881 amounted to 38'41 inches, the maximum during that period being 54'5 inches in 1867, and the minimum 18'3 inches in 1868. From January to May, the average fall is 3'38 inches; from June to September, 33'41 inches; from October to December, 1'62 inches. The mean annual temperature is said to be about 75° F., but no accurate thermometrical returns are available. Except in the extreme north, near the *taráí*, the climate generally is healthy; but fevers prevail in that portion of the District every spring and autumn. The valley of the Sot is also very malarious. The total number of deaths reported in 1883 was 28,126, or 32'71 per thousand, as against an average of 46'58 per thousand for the previous five years. The mortality caused by the epidemic fever of 1879 and 1880 following on the famine of 1878, has been already alluded to. The District contains six charitable dispensaries—at Sháhjahánpur, Katra, Gularia, Jalálábád, Tilhár, and Páwdyan. In 1883 they afforded relief to

32,205 persons, of whom 1167 were in-door patients. [For further information regarding Sháhjahánpur, see the *Gazetteer of the North-Western Provinces*, vol. ix., by F. H. Fisher, Esq., C.S. (Government Press, Alláhábád, 1883). Also the *Report on the Settlement of Sháhjahánpur District*, between 1867-68 and 1875, by R. G. Currie, Esq., C.S.; the *Census Report of the North-Western Provinces* for 1881; and the several annual Administration and Departmental Reports of the Provincial Government.]

Sháhjahánpur.—South-eastern *tahsil* of Sháhjahánpur District, North-Western Provinces, comprising the three *pargandás* of Sháhjahánpur, Jamaur, and Kánt. The Garra river forms the boundary between Sháhjahánpur and Jamaur *pargandás*, the latter lying between the Garra river and the Garai *nála*, which last separates it from Kánt *pargandá*. Throughout Sháhjahánpur *pargandá*, the surface of the country is level, except where it is broken by the Khanaut river; and the soil is a good loam called *dumat*. Well irrigation is ordinarily needed, but the soil retains moisture well, and one watering is usually sufficient for wheat. Jamaur *pargandá*, with the exception of a narrow strip of *dumat* along the right bank of the Garra, lies low and is composed of a hard clay soil, requiring constant irrigation for the spring crops. Kánt *pargandá*, with the exception of the valley of the Garai, is composed of a light sandy soil, which, though not equal in productiveness to the *dumat* of Sháhjahánpur *pargandá*, nevertheless retains moisture well, and produces fair crops in ordinary years without the necessity of any extensive irrigation.

Area, 401 square miles. Population (1881) 252,028, namely, males 133,206, and females 118,822. Average density of population, 628.5 persons per square mile. Hindus, 192,487; Muhammadans, 58,113; Christians, 1362; and 'others,' 66. Of the 467 towns and villages in the *tahsil*, 359 contain less than five hundred inhabitants; 80 between five hundred and a thousand, and 27 between one thousand and five thousand. The only place with upwards of five thousand is Sháhjahánpur city. Area assessed for Government revenue, 392 square miles, namely, 242 square miles cultivated, 108 square miles cultivable, and 42 square miles uncultivable waste. Total Government land revenue, £29,062, or including local rates and cesses, £32,602. Total rental paid by cultivators, including cesses, £61,262. The chief tenure is *zamindari*, but there is not a single large proprietor in the *tahsil*. In 1884, Sháhjahánpur *tahsil* contained (including the District head-quarter courts) 3 civil and 10 criminal courts, with a regular police force of 357 officers and men.

Sháhjahánpur.—Chief town, municipality, and administrative head-quarters of Sháhjahánpur District, North-Western Provinces; situated in lat. 27° 53' 41" N., and long. 79° 57' 30" E.; on the left

bank of the river Deoha or Garra, crowning the high ground just above its junction with the Khanaut. An old fort overhangs the confluence; and a large masonry bridge, built by Hakim Mehndi Ali, spans the smaller river. The city was founded in 1647, during the reign of the Emperor Shāh Jahān, whose name it bears, by Nawāb Bahādūr Khān, a Pathān. There is nothing of any special note in the history of the city, apart from that of the District generally, during the 210 years which elapsed between its foundation and 1857, when it became the scene of open rebellion during the Mutiny. The incidents of 1857 and 1858 are described in sufficient detail in the historical section of the District article (*q.v.*).

Population (1872) 72,140; (1881) 77,936, namely, males 39,293, and females 38,643. Hindus number 37,811; Muhammadans, 39,080; Christians, 979; and 'others,' 66. Number of houses, 13,776. Municipal income (1883-84), £6372, of which £5184 was derived from taxation in the shape of octroi duties; average incidence of taxation, 1s. 4d. per head. Shāhjahānpur is a station on the Oudh and Rohilkhand Railway, and is also connected by good roads with Lucknow, Bareilly, Farukhābād, Pilibhīt, Muhamdi, and Hardoi. The main street runs from near the old fort for a distance of about 1½ mile through the heart of the city to Bahādurganj market, near its northern limits. From Bahādurganj, the city extends outside the cantonments for fully a mile, crossing the road to Bareilly and stretching out along the Pilibhīt road. In the opposite direction to the south-east, it extends across the Khanaut stream, near Hakim Mehndi's bridge. From north to south, the extreme length of the city is upwards of four miles, while the breadth is seldom more than one mile, and generally less. The population is only dense in certain quarters, and patches of cultivated land and gardens of fruit-trees are found everywhere.

The *tahsil* courts, police station, and the dispensary are situated in the centre of the city, in the main street. The police lines, jail, and high school are on the edge of the city, overlooking the valley of the Khanaut. Farther north are the District, civil, criminal, and revenue courts. The civil lines consist of a small piece of land bounded on three sides by the cantonment, and on the fourth by the native city; but the house accommodation is said to be insufficient for the requirements of the civil residents. Before the Mutiny, native troops only were stationed at Shāhjahānpur. The military force now consists of a wing of a European and a wing of a native infantry regiment. The barracks, built after the Mutiny, are comfortable and well-constructed buildings. The station contains an English church, and three churches for native converts maintained by the American Methodist Mission, which also supports one large and several small schools for boys and

girls, an orphanage, and a dispensary. In addition to the 'high school and mission school, the town contains a Government *tahsili* school, and a municipal free school.

Sháhjahánpur, taking its population into consideration, is a city of comparatively little commercial importance. The only local manufacture is sugar, which, with cereals and pulses, forms the principal export. The Rosa sugar factory and rum distillery is situated on the Garra river, a few miles from the city, with which it is connected by a short branch of the Oudh and Rohilkhand Railway. The three principal markets in the city are Bahádurganj, near the cantonment and civil station; Carewganj, at the other or southern end; and a new vegetable market in the centre of the town, constructed in 1878-79 by the municipality.

Sháhjahánpur.—Town in Gwalior State, Central India; situated on the Bombay-Agra Trunk Road between Guna (Goona) and Indore, 106 miles from the former, and 60 miles from the latter town. Head-quarters of the Sháhjahánpur District of Gwalior. Population (1881) 9247, namely, Hindus, 7168; Muhammadans, 2064; and 'others,' 15.

Shah-ki-dherí.—Village and ruins in Ráwal Pindí District, Punjab.—*See* DERI SHAHAN.

Sháhlímar.—Gardens and pleasure-ground in Lahore District, Punjab, 4 miles east of Lahore city.—*See* SHALAMAR.

Sháhpur.—A British District in the Punjab, lying between 31° 32' and 32° 42' N. lat., and between 71° 37' and 73° 24' E. long. Area, 4691 square miles. Population (1881) 121,508 souls. Sháhpur forms the southernmost District of the Ráwal Pindí Division. It is bounded on the north by the Pind Dádan Khán and Talágang *tahsils* of Jehlam (Jhelum) District; on the east by Gujrát and Gujránwála Districts, the Chenab river marking the boundary for a portion of the distance; on the south by Jhang District; and on the west by Dera Ismáíl Khán and Bannu Districts. Sháhpur is divided into three *tahsils*—Bherá in the east and Shahpur in the west, forming the cis-Jehlam portion of the District; and Khusháb, the trans-Jehlam tract. The District stands seventh in order of area, and twenty-fourth in order of population, among the 32 Districts of the Punjab, and comprises 4·40 per cent. of the total area, and 2·23 per cent. of the total population, of the Province. The administrative head-quarters are at the small town of SHAHPUR on the Jehlam river, but BHERA is the largest place in the District.

Physical Aspects.—The District of Sháhpur consists of an irregular block of country, artificially demarcated for administrative purposes, and stretching from the western bank of the Chenab, across the valley of the Jehlam, far into the heart of the Sind Sagar Doab, and up to the centre of the Salt Range. On either side of the Jehlam, which

divides the District into two nearly equal portions, lie wide upland plains, utterly barren or covered only with coarse low brushwood. Much, however, of this area is composed of good soil only requiring irrigation to make it productive of fine crops; indeed, excepting the *thal* or barren sandy tract of the Sind Ságar Doáb, there is little land that would not repay the labour of the husbandman could he but procure water at a moderate cost. As it is, however, about 83 per cent. of the area still remains untouched by the hand of man; while in the southern half of the District, cultivation is for the most part confined to a strip of land varying from three to fifteen miles in width along the banks of the Jehlam and Chenáb rivers.

But although so large a portion of the surface consists of native prairie, considerable variety exists in the aspect of the country. Beginning from the south-eastern border, the first well-marked natural tract comprises the lowlands of the Chenáb, where percolation from the river spreads fertility over a long belt about 10 or 12 miles in width, along the whole of its course. Above these fruitful and well-watered levels, the *hár* or central table-land of the Jetch Doáb stretches in a monotonous undulating waste of desert or jungle to the valley of the Jehlam. The soil of this upland is naturally good; but the impossibility of obtaining water precludes all hope of cultivation, except in a few hollow basins, where the crops depend upon the capricious rainfall for their whole supply. Population is scanty; villages are few, and separated from each other by great distances. Numerous herds of cattle, however, roam at will over the prairie jungles, and obtain abundant pasturage from the luxuriant carpet of grass which covers the surface after the rains.

A second zone of cultivation fringes either bank of the Jehlam, though not extending so far inland as on the Chenáb. The lowland strips on both sides of the Jetch Doáb are popularly divided into the *hitar*, or alluvial tract immediately bordering the river, and the *nakka*, or slope just beyond the range of percolation. The former contains the most prosperous villages, and is covered throughout its entire length by one unbroken sheet of grain for the *rabi* or spring harvest, without the necessity for artificial irrigation; the latter depends upon the water-supply from wells, and has smaller and more straggling villages scattered at wide distances from one another.

Beyond the Jehlam valley rises a second table-land, the *thal* of the Sind Ságar Doáb, a far more forbidding and desert expanse than the *hár*. Northward, a hard level plain, impregnated in places with salt, and almost devoid of vegetation, stretches away monotonously to the foot of the Salt Range. To the east and south, a sandy plateau runs onward till it merges in the utter desert of Dera Ismáíl Khán. The extreme southern portion resembles an angry sea of sand, tossed into

wave-like hillocks, between which lie undulating troughs of short coarse grass.

The north of Sháhpur District is occupied by a part of the Salt Range, which runs right across the Doáb, and rises to its greatest height in Mount Sakeswar, 5000 feet above sea-level. It consists of two divergent chains, which unite again at either end, and enclose a number of rock-bound alluvial basins, interspersed with picturesque lakes. Little patches of rich cultivation are found amid the nooks and valleys of the range, rendered fruitful by the fresh alluvial *detritus* from the surrounding peaks, and watered by the comparatively abundant rainfall of the hill tract. The southern face of the range presents a bold mass of broken and rugged cliffs, whose distorted strata and huge detached rocks give an air of sublimity to the scenery. Many torrents flow through the gorges on its side, and spread fertility over a narrow strip of lowland at the base, known as the *mohár*. Thence an intermediate belt of pasture land, the *danda*, leads on imperceptibly to the wild sandy waste of the *thal*.

The Jehlam (Jhelum) river traverses the District throughout its entire length from north to south. In Sháhpur it is a muddy river, with a current of about 4 miles an hour; average width of the stream in times of flood, about 800 yards, dwindling down in the winter months to less than half this width. A remarkable feature of this river is the sudden freshets to which it is subject. These occur after very heavy rain in the hills, when the swollen stream, overflowing its banks, inundates the country for miles on either side for a day or two, and then gradually subsides within its normal bounds, leaving the soil enriched with a valuable alluvial deposit. The Chenáb, which forms the boundary between Sháhpur and Gujránwála for 25 miles, has a greater volume of water than the Jehlam, but its current is more sluggish, and though impetuous in flood, the average velocity does not exceed $2\frac{1}{2}$ miles an hour. The flood deposits of the Chenáb are inferior in richness and in quantity to those of the Jehlam.

A characteristic feature of Sháhpur District is its system of inundation canals. The remains of ancient cuttings are met with along the edge of the *kár* tract; but these had been allowed to fall into disuse, and have long since silted up. In 1860, one of the channels was experimentally cleared out by the District officer, and the success of the trial induced an enterprising native gentleman to excavate an entirely new canal to irrigate a grant of waste land of which he had obtained a lease. This work was completely successful; and since 1860, twenty-six inundation canals have been constructed for irrigation purposes, of which six are Government works, aggregating 115 miles in length, and irrigating 33,700 acres; and 20 are private canals, with a total length of $235\frac{1}{2}$ miles, and irrigating 43,628 acres.

Forest Conservancy.—Although Shahpur District contains no large forest trees it is scantily wooded in parts with ordinary timber and shrubs suitable for fuel and other purposes. In the Khushab *taluk* of the Salt Range tract, 31 *rakhs* with an area of 134,824 acres have been placed under the control of the Forest Department, besides 35 other *rakhs* with an area of 142,920 acres in Bhera *taluk* in the elevated *sur* lands between the Jhelum and Chenab rivers. The predominating trees and shrubs met with in the Salt Range *rakhs* are *sarkis* (*Dodonaea viscosa*), *shikhar* (*Adhatoda Vasical plantis*) (*Celastrus spinosus*), *phalsi* (*Acacia modesta*), *karu* or olive (*Olea ferruginea*), occasional specimens of *shikim* or *sissu* (*Dalbergia Sissoo*), *kar* (*Acacia arabica*), and *shab* (*Butea frondosa*). In favourable localities, such as the summits of some of the higher peaks, many other species are found, such as *karur* (*Psadia integerrima*), *kar* (*Bauhinia variegata*), *karini* (*Ocina Wodier*), *alamnar* (*Grewia oppositifolia*), *kar* or pomegranate (*Punica Granatum*), *shikhar* (*Tecoma undulata*), *pagri* or box (*Buxus sen perirens*), *shikhar* or wild datepalm (*Phoenix sylvestris*), *shik* (*Chamærops Reticularis*), *kar* or bamboo (*Dendrocalamus strictus*). As yet no forest settlement has been effected, and hitherto the work of the Department has been purely protective. A few village communities in the Salt Range enjoy the privilege of pasturing cattle and collecting dry wood in the *rakhs*, while the general proprietary right belongs to Government. The Government rights in the *rakhs* of the *sur* tract in Bhera *taluk* are absolute. These *rakhs* produce pasture and wood fuel, consisting chiefly of *phalsi* (*Prosopis spicigera*), *kar* (*Capparis aphylla*), *man* (*Spatholobus Roxburghii*), and *kar* (*Salicetia o'oides*). As yet no wood has been felled, but the pasturage is annually leased to contractors, yielding a revenue of £2250.

Minerals.—Salt is found throughout the hills which derive their name from this mineral, concealed in the red mud which gives to the range one of its most characteristic features. The salt is exceedingly pure, and as the average thickness of the beds is probably not less than 150 feet, the supply appears to be inexhaustible. The salt workings are mainly situated in Jhelum District, and only one mine is worked in Shahpur, at Wartha. This mine is a large cave, supported by pillars at regular intervals. The strata worked is 20 feet thick. The output from the mine in 1883-84 was 190,987 *manas*, or 6991 tons; average output for the four years ending 1883-84, 146,014 *manas*, or 5376 tons. The duty realised in 1883-84 amounted to £37,000 against an average of £32,334 for the four years. The miners are paid at the rate of 70 *ad* per 100 *manas* of salt excavated by them. The annual cost of the mine and guarding establishment amounts to about £2100 a year.

The other mineral products of Sháhpur are saltpetre, the manufacture of which received a great impulse at the time of the Crimean War, but has now almost dwindled away. Lignite, iron, and lead are found in the Salt Range, but in too small quantities to be practically useful. Gypsum and mica are also found in considerable quantities in the same hills.

Feræ Naturæ.—Tigers, leopards, and wolves are found in the Salt Range; while in the *bár* and flat country generally, are found quail, partridges, sand-grouse, hare, bustard, antelope, wild geese, and ducks. In the hilly tract, the *uríál* or wild sheep, and the *chikor* or hill partridge, are found. The lakes of the Salt Range are the favourite abodes of the scarlet flamingo. Snakes are common in all parts of the District.

History.—Though little definite information can be recovered with regard to the annals of Sháhpur District prior to the decline of the Mughal dynasty, the numerous remains studded about the *bár* clearly prove that at some remote period the whole country between the Chenáb and the Jehlam consisted of a flourishing and well-watered agricultural plain. Mounds of earth, covered with fragments of brick or pottery, lie scattered over the whole table-land, marking the ancient sites of towns and villages in a tract now only inhabited by half-savage pastoral tribes. The historians of Alexander speak of the country as 'teeming with population;' and local tradition affirms that, so late as the time of Akbar, great prosperity extended over the entire *bár*. The present desert condition of the plateau is no doubt attributable to a gradual subsidence of the water level. There are spots where the brick-work of old wells still existing does not extend more than 25 feet in depth; while now, in the same place, water cannot be obtained within 60 feet of the surface, and even when found is usually so brackish as to be unfit for the use of man or beast.

The dawn of authentic history in Shahpur extends no further back than the reign of Muhammad Sháh, when Rajá Salamat Rái, a Rájput of the Anand tribe, administered Bhera and the surrounding country; while Khusháb was managed by Nawáb Ahmadýar Khán, and the south-eastern tract along the Chenáb formed part of the territories under the charge of Mahárája Kaura Mall, Governor of Múltán. At the same time, the *thal* was included among the dominions of the Balúch families of Dera Ghazi Khán and Dera Ismaíl Khan.

During the anarchic period which succeeded the disruption of the Mughal Empire, even this remote region became the scene of Sikh and Afghán incursions. In the year 1757, a force under Núr-ud-dín Bamizai, despatched by Ahmad Shah Duráni, to assist his son Timúr in repelling the Maráthás, crossed the Jehlam at Khusháb, marched up the left bank of the river, and laid waste the three largest towns

of the District. Bhera and Míáni (Meeanee) rose again from their ruins; but only the foundations of Chak Sánu now mark its former site. About the same time, by the death of Nawáb Ahmadyár Khán, Khusháb also passed into the hands of Rájá Salámat Rái. Shortly afterwards, however, Abbás Khán, a Khattak, who held Pind Dádan Khán and the Salt Range for Ahmad Sháh, treacherously put the Rájá to death, and seized upon Bhera. But Abbás Khán was himself thrown into prison as a revenue defaulter; and Fateh Singh, nephew of Salámat Rái, then recovered his uncle's dominions.

After the final success of the Sikhs against Ahmad Sháh in 1763, Chhattar Singh, of the Sukarchakia *misl* or confederacy, overran the whole Salt Range, while the Bhangi chieftains parcelled out among themselves the country between those hills and the Chenáb. Meanwhile, the Muhammadan rulers of Sahiwal, Mitha Tiwána, and Khusháb had assumed independence, and managed, though hard pressed, to resist the encroachments of the Sikhs. The succeeding period was one of constant anarchy, aggressive warfare, and territorial changes among the petty princes of the District, only checked by the gradual rise of Mahá Singh, and his son, the great Mahárájá Ranjít Singh. The former made himself master of Míáni in 1783; and the latter succeeded in annexing Bhera in 1803. Six years later, Ranjít Singh turned his arms against the Balúch chieftains of Sahiwal and Khusháb, whom he overcame by combined force and treachery. At the same time, he swallowed up certain smaller domains in the same neighbourhood; and in 1810, effected the conquest of all the country subject to the Sidí chiefs of Jhang.

In 1816, the conqueror turned his attention to the Málíks of Mitha Tiwána. The Muhammadan chief retired to Núrpur, in the heart of the *thal*, hoping that scarcity of water and of supplies might check the Sikh advance. But Ranjít Singh's general sank wells as he marched, so that the Tiwánas fled in despair, and wandered about for a time as outcasts. The Mahárájá, however, after annexing their territory, dreaded their energy and influence, and therefore endeavoured to conciliate them by inviting them to Lahore, where he made a liberal provision for their support. On the death of the famous Hari Singh—to whom had been assigned the Tiwána estates—at Jamrud, in 1837, Fateh Khán, the representative of the Tiwána family, obtained a grant of the ancestral domains from his patron at court, Rájá Dhían Singh. Thenceforward, Málík Fateh Khán took a prominent part in the turbulent politics of the Sikh realm, after the rapidly succeeding deaths of Ranjít Singh, his son, and grandson. Thrown into prison by the opposite faction, after the murder of Dhían Singh, he was released by Lieut. (afterwards Sir Herbert) Edwardes, who sent him to Bannu on the outbreak of the Múltán rebellion to relieve Lieut.

Taylor. Shortly afterwards the Sikh troops mutinied, and Fateh Khán was shot down while boldly challenging the bravest champion of the Sikhs to meet him in single combat. His son and a cousin proved themselves actively loyal during the revolt, and were rewarded for their good service both at this period and after the Mutiny of 1857.

Sháhpur District passed under direct British rule, with the rest of the Punjab, at the close of the second Sikh war. At the time of annexation, the greater part of the country was peopled only by wild pastoral tribes, without fixed abodes, but moving from place to place in search of grass and water. Under the influence of settled government, they have begun to establish themselves in permanent habitations, to cultivate the soil in all suitable places, and to acquire a feeling of attachment to their regular homes. The Mutiny of 1857 had little influence upon Sháhpur. The District remained tranquil; and though the villages of the *bár* gave cause for alarm, no outbreak of sepoys took place, and the wild tribes of the upland did not revolt even when their brethren in the *Múltán* Division took up arms. A body of *Tiwána* horse, levied in the District, did excellent service, and earned for their *Málik*s the coveted title of Khán Bahádur.

Population.—The Census of 1855 was taken over an area so greatly altered by subsequent territorial changes (as the trans-Jehlam tract then lay chiefly within the old District of Leiah) that detailed comparison with later statistics becomes impossible. A rough calculation, however, would appear to show that the general density of population increased 25 per cent. between that date and 1868; and although this increase may be regarded as high, there can be no doubt that the number of inhabitants has grown with great rapidity ever since the annexation. The enumeration of 1868 disclosed a population of 368,288, on an area corresponding to that of the present District. At the last Census in 1881, the population of Sháhpur was returned at 421,508, showing an increase of 53,220, or 14·4 per cent., in the thirteen years between 1868 and 1881. Much of the increase is due to immigration from Gujránwála, Gujráat, and Jhang, owing to the rapid extension of canal irrigation during late years.

The results of the Census of 1881 may be summarized as follows:—Area of District, 4691 square miles; number of towns 6, and of villages 651; number of houses, 72,084; number of families, 98,905. Total population, 421,508, namely, males 221,676, and females 199,832; proportion of males, 52·6 per cent. Average density of the population, 90 persons per square mile. But though the density of population is thus low, when the desert area is taken into account, the proportion of inhabitants to the cultivable surface is really very high, being upwards of 400 per square mile in the tilled portions of the Salt Range. The cultivable land, indeed, is very much sub-divided,

and is barely sufficient for the support of its inhabitants. Villages per square mile, 14; persons per village, 642; houses per square mile, 19; persons per house, 5·85. Classified according to sex and age, there were in 1881—under 15 years of age, boys 89,567, and girls 81,194, total children, 170,761, or 40·5 per cent. of the population: 15 years and upwards, males 132,109, and females 118,638; total adults, 250,747, or 59·5 per cent.

Religion—Classified according to religion, the Muhammadans form the great bulk of the population, being returned at 357,742, or 84·9 per cent; Hindus number 50,026; Sikhs, 4702; Christians, 29; and Jains, 9. The principal Muhammadan tribes include—Balúchís, 8865; Sayyids, 8625; Shaikhs, 7499, Patháns, 3076; and Mughals, 2335. These are Muhammadans by race descent. The following tribes are mainly Muhammadans by conversion of Hindus and aboriginal races in the time of the early Muhammadan invasions, and most of them still contain a proportion of Hindus—Rájput, 82,290; Awan, 48,485; Ját, 34,508; Chuhrá, 28,297; Juláha, 22,472; Muchí, 15,314; Kumbhár, 11,769; Machhí, 11,156; Tarkhan, 10,270; Khokhar, 10,265; Arain, 8574; Mirási, 8344; Nai, 7541; Dhobí, 5624; Kassáb, 5202, Lohár, 5074; Sonár, 3597; and Telí, 2112. The castes which still remain almost entirely Hindus or Sikhs, are the Bráhmaṇ, 5462; Arora, 35,017; and Khattri, 15,015. The land-owning classes and the great mass of the village servants are Muhammadans; the Hindus and Sikhs being almost confined to the mercantile and official classes and their priests. The proportion of Hindus is much greater in towns than in villages. The six towns contain two-fifths of the entire Hindu population of the District, and the remainder are absorbed in the larger villages, since in the smaller ones not a single Hindu is met with, except here and there a petty shopkeeper.

Town and Rural Population.—The following six towns are returned in the Census of 1881—SHAHPUR, the civil head-quarters station of the District, population (1881) 7752; BHERA, 15,165; KHUSHI, 8989; SHAHIWAL, 8880; MIANI, 8069; and GIROT, 2776. Total urban population, 51,631, or 12·2 per cent. of that of the whole District. These towns are all municipalities, with a total municipal income in 1883-84 of £3405, or an average of 1s. 4d. per head. Of the 651 villages or collections of hamlets comprising the rural population, 198 contain less than two hundred inhabitants; 210 between two and five hundred; 144 between five hundred and a thousand; 71 between one and two thousand; 21 between two and three thousand; and 8 between three and five thousand. As regards occupation, the Census of 1881 divided the adult male population of Sháhpur into the following seven main classes:—(1) Professional and official class, 71; (2) domestic and menial class, 4619; (3) commercial class, 11,111; (4) agriculturists, 11,111; (5) artisans, 11,111; (6) traders, 11,111; (7) others, 11,111.

carriers, etc., 5197; (4) agricultural and pastoral class, including gardeners, 60,884; (5) industrial and manufacturing class, including all artisans, 30,635; (6) indefinite and non-productive class, comprising general labourers, 13,972; and (7) unspecified, 12,631.

Agriculture.—The total area under cultivation in 1883-84 amounted to 557,513 acres, of which 336,655 acres were artificially irrigated. Of the remaining area, 796,912 acres in the *Ar* tract are utilized for grazing purposes; 1,156,890 acres would be cultivable with the assistance of irrigation; while 496,773 acres are uncultivable waste. The spring harvest forms the main crop of the District. Wheat, the spring staple, covers nearly half the cultivated area; while spiked millet and cotton make up the chief items of the autumn harvest. Among the more valuable commercial crops, sugar-cane is grown only in the valley of the Chenáb, and poppy in the Jehlam lowlands between Shihpur and Bhera. Wheat thrives best in the alluvial soils that fringe the two rivers, where it is the only crop grown, as after it is cut floods inundate the whole valley, and only subside in time for the next sowing. It also grows luxuriantly in the rich hollows and basins among the Salt Range, where the cool climate admirably suits it.

The area under the principal crops in 1883-84 is returned as follows:—Wheat, 214,314 acres; *bañra*, 80,860 acres; *jañra*, 17,865 acres; gram, 13,100 acres; oil-seeds, 23,468 acres; and cotton, 22,901 acres. Rice was grown on only 383 acres. The use of manure and the rotation of crops are little understood. Land from which a spring crop has been taken is occasionally sown afresh for the autumn harvest. In the Salt Range, the richness of the soil admits of successive sowings without any repose; in the tract below the hills, the torrents bring down perpetual supplies of fresh *detritus*; in the alluvial fringe of the rivers, the floods fertilize the soil by their annual deposit of silt, and so render possible a constant succession of double crops; but elsewhere the land lies fallow every second year. The average out-turn per acre of the principal products was returned as follows in 1883-84:—Wheat, 780 lbs.; inferior grains, 430 lbs.; oil-seeds, 350 lbs.; cotton, 140 lbs. The agricultural stock in the same year consisted of—cows and bullocks, 199,740; horses, 2826; ponies, 1527; donkeys, 10,860; sheep and goats, 202,293; camels, 18,174; carts, 482; and ploughs, 51,015. An annual horse show is held every spring, at which prizes are given for the encouragement of horse-breeding. A cattle fair was held in connection with the horse show in 1882-83. The anarchy which followed the break-up of the Delhi Empire, and the grinding nature of the Sikh rule, have resulted in the disintegration of the village communities. Most of the tenures at present in existence belong to the type known as *1151* *1152*. Only 66 villages retain the ancient communal type. Agricultural labourers receive their wages entirely in kind, usually in the form of a

missioner, 2 Assistant Commissioners, 1 *tahsildār*, and 1 *munsif*. These officers preside over 6 civil and 5 criminal courts; number of police circles (*thānds*), 5; strength of regular police, 88 men; rural police or village watch (*chaukidārs*), 136.

Sháhpur.—Town and administrative head-quarters of Sháhpur District, Punjab; situated in lat. $32^{\circ} 16' N.$, and long. $72^{\circ} 31' E.$, two miles from the left bank of the Jehlam (Jhelum) river, exactly opposite KHUSHAB, on the road from Lahore to Dera Ismáíl Khán. It was formerly on the river bank, but of late years the Jehlam has been receding in the direction of Khusháb. Founded by a colony of Sayyids under one Sháh Shams, whose descendants still form the proprietary body. Sháh Shams' tomb is situated east of the town. He is revered as a saint, and a large annual fair, attended by some 20,000 persons, is held at the tomb. Population of Sháhpur village (1881), 5424; and of the civil station, which lies 3 miles to the east, 2328. Total population of town and civil station, 7752, namely, Muhammadans, 5253; Hindus, 2408; Sikhs, 74; and 'others,' 17. Number of houses, 1024. Municipal income, £131. The roads of the station are wide, and well shaded by trees, and watered in the hot weather from an inundation canal which passes through the town. Good crops of grain and grass are raised in the lands attached to the station, chiefly by the aid of canal irrigation. Small, neatly-laid-out *bázār*, with wide streets. Hospital, two schools, and three public gardens. An annual horse and cattle fair is held at the civil station. Court-house, *tahsili*, police station, staging bungalow, *sardi* (native inn), and town hall.

Sháhpur.—Village in Kosi *tahsil*, Muttra District, North-Western Provinces; situated in lat. $27^{\circ} 54' 5'' N.$, and long. $77^{\circ} 33' 30'' E.$ Population (1881) 2221. Now a petty agricultural village, but formerly the head-quarters of a large estate yielding £2800 a year, conferred by Lord Lake upon Nawáb Ashraf All, who ordinarily resided here, and the remains of whose fort lie outside the village. During the Nawáb's lifetime, Sháhpur was a populous and important town.

Sháhpur.—Town and municipality in Gurdaspur District, Punjab. Population in 1881, 1258, comprising 912 Hindus, 336 Muhammadans, and 10 Sikhs. Number of houses, 362. Municipal revenue (1880-81), £110; average incidence of taxation, 1s. 9d. per head of the population.

Sháhpur.—Village in Ságar *tahsil*, Ságar District, Central Provinces. Population (1881) 2364, namely, Hindus, 1976; Jains, 299; Muhammadans, 88; and Christian, 1.

Sháhpur.—Village in Burhánpur *tahsil*, Nimár District, Central Provinces. Population (1881) 3812, namely, Hindus, 3473; Muhammadans, 233; and Jains, 106.

Sháhpur.—Hill range in Mándlā District, Central Provinces; north

of the Narbadī (Nerbudda) river, while the Johilī flows below. Forms part of the watershed between Eastern and Western India. The scenery is wild and desolate, the only inhabitants being a few small colonies of Gonds and Baigās. The Gejar and Ganjāi stream down from the highlands in a series of waterfalls, the finest of which is 60 feet high; behind the falls yawn dark caverns, tenanted by wild beasts and by reputed evil spirits. Most of the range, however, is under the immediate protection of Mahādeva.

Shāhpur.—Petty State of the Hallār *prant* or division of Kāthiāwār, Bombay Presidency; consisting of 4 villages, with 1 proprietor or tribute-payer. Area, 10 square miles. Population (1881) 1237. Estimated revenue, £650; of which £46, 8s. is paid as tribute to the British Government, and £14, 12s. to the Nawāb of Junāgarh.

Shāhpura.—Native State in Rājputāna, under the political superintendence of the Rājputāna Agency. Estimated area, 400 square miles. Population (1881) 51,750, namely, males 27,217, and females 24,533; dwelling in 1 town and 117 villages, and in 10,849 houses. Density of population, 129·37 persons per square mile; villages per square mile, ·29; houses per square mile, 27·19; persons per house, 4·77. Hindus number 48,333; Muhammadans, 2771; Jains, 643; and Christians, 3. The Hindus are sub-divided into—Brāhmans, 6118; Rājputs, 1776; Mahājans, 4130; Gūjars, 4806; Jāts, 4229; Minas, 922; Bhīls, 1841; Chamārs, 4172; Dhakurs, 357; Balals, 2126; and 'others,' 17,856. The Muhammadans by tribes—Shaikhls, 769; Sayyids, 45; Mughals, 13; Pathāns, 399; and 'others,' 1545. Revenue, excluding alienations, about £25,000. The country is flat and treeless, but fertile; much of it is pasture land.

The Rājā of Shāhpura also holds a fief under the Mahārānā of Udaipur or Mewār, consisting of 80 villages, with an estimated population of about 16,000 persons, and a revenue of £3500. Tribute of £300 is paid to the State of Udaipur. The Rājā is thus a feudatory both of the British Government and of Udaipur. The ruling family is of the Sesodia Rājput clan, being descended from a former Rānā of Udaipur. The founder of the house was Surāj Mall, a younger son of the Rānā, from whom the late chief was tenth in lineal descent. Surāj Mall received as his portion the *pargana* of Kherar in Udaipur; and his son also acquired from the Emperor Shāh Jahān, in reward for his gallant services, a grant of the *pargana* of Phulīa out of the crown lands of Ajmere, upon condition of furnishing certain horse and footmen for service. He abandoned the town of Phulīa and founded the present town of SHAHPURA. In 1848, the Rājā of Shāhpura received a *sansad* from the British Government fixing the amount of his tribute at £1000 per annum, with the proviso that if the customs duties levied in Ajmere were abolished he should also cease

to collect such duties, and in consideration of the loss of revenue his tribute should be reduced to £200. The chief also holds a *sanad* guaranteeing to him the right of adoption. The present Rájá, Dhiráj Nahar Singh, was born in 1855. A dispensary; vaccination is encouraged. Two schools. The military force of the State consists of 12 guns, 20 artillerymen, 160 cavalry, and 335 infantry.

Sháhpura.—Capital of Sháhpura State, Rájputána. Lat. $27^{\circ} 23' 45''$ N., long. $76^{\circ} 1'$ E. School, in which Hindi and arithmetic are the chief subjects taught, attended in 1881 by 130 pupils. In 1875, a girls' school was established, but it was closed soon afterwards, though endeavours were being made in 1884 to resuscitate it. Population (1881) 10,652, namely, males 5453, and females 5199. Hindus number 8729, Muhammadans, 1920, and Christians, 3.

Sháhpurá.—Town in Rámgarh *tahsíl*, Mándlá District, Central Provinces. Population (1881) 2588, namely, Hindus, 2023; Muhammadans, 151; Jains, 5; Christians, 2; and non-Hindu aborigines, 407.

Sháhpuri.—Small island, situated at the mouth of the Náaf river in Chittagong District, Bengal; famous as having afforded the *casus belli* of the first Anglo-Burmese war. The Burmese claimed possession of the island, although it had for many years been in the undisputed occupation of the British. Tolls were levied upon boats belonging to Chittagong; and on one occasion, the demand being resisted, the Burmese fired upon the party and killed the steersman. This act of violence was followed by the assemblage of armed men on the eastern side of the Náaf, and universal consternation pervaded the villages in this the most remote and unprotected portion of Chittagong District. On the night of the 24th September 1823, the Burmese proceeded to enforce their claim to the island of Sháhpuri; a thousand men landed on the island, overpowered the guard, killed and wounded several of the party, and drove the rest off the island. As soon as this was known at Calcutta, a detachment of troops was sent to dislodge the Burmese, who, however, had previously retired. The occupation of Sháhpuri by a military force had the effect of arresting for a time the hostile demonstrations of the Burmese on the Chittagong frontier. But not long afterwards the Rájá of Arakan was ordered to expel the English from Sháhpuri, and officials from Ava proceeded to take possession of the island, which had been temporarily abandoned on account of its unhealthiness. Thus and other acts of hostility rendered war inevitable; and in a proclamation dated the 24th February 1824, the grounds on which the first Burmese war was declared were made known.

Shahr Sultán.—Town and municipality in Alipur *tahsíl*, Muzaffargarh District, Punjab; situated in lat. $29^{\circ} 35'$ N., and long. $71^{\circ} 2'$ E., $1\frac{1}{2}$ mile south of the Chenáb, on the road leading south from Muzaffargarh town. Population (1881) 2132, namely, Hindus, 1213; Muhammadans,

913; and Sikhs, 6. Number of houses, 275. Municipal income (1883-84), £155, or an average of rs. 5½d. per head. The town is favourably situated for trade; and as in all towns in this part of the country, beams are placed over the streets and covered with matting, so as to form a shady arcade. Police station, and primary school.

Sháhzádpur.—Town in Siráthu *tahsil*, Allahábád District, North-Western Provinces; situated on the banks of the Ganges about a mile north of the Grand Trunk Road, and 6 miles east of Siráthu town; lat. 25° 39' 55" N., long. 81° 27' E. Population (1881) 3496. Formerly a flourishing town, and famous for its stamped cloth, and large trade in saltpetre; but now decayed and declining in population. Station of the Grand Trigonometrical Survey; post-office; ferry across the Ganges. A small house-tax is raised for police and conservancy purposes.

Shaikháwati (*Shekháwati*).—A Province of Jaipur State in Rájputána; situated between lat. 27° 20' and 28° 33' N., and long. 74° 40' and 76° 5' E. It is bounded on the north-east by the Punjab States of Loháru and Patiála, on the south-east by Jaipur proper, on the south by Jodhpur or Márwár, and on the west and north-west by Bikaner. The area is estimated at 5400 square miles; and the population, according to the Census of 1881, is 418,686 souls. In its physical aspects, the more fertile part of Shaikháwati resembles Jaipur; but a large portion of the soil is sandy desert, like that of Bikaner. There are no perennial rivers; but a small stream, which rises in the northern part of Jaipur, flows northward for some distance through Shaikháwati, ultimately losing itself in the sand. There is an important salt lake in the Province, called Kachor-Rewas; it is not worked by any means to its full capacity, but the yearly turn-out of salt is about 6000 tons. The minerals of Shaikháwati are important; the copper-mines near Khetri being perhaps the most valuable in India. The ores are copper pyrites, mixed, it is said, with grey copper-ore (sahlerz or tetrahedrite); some carbonates also occur, and native copper has been found. Near the surface, also, in the shales, blue vitriol is produced by the decomposition of the pyrites. In the same mines cobalt is also obtained, the ore occurring in small veins. These mines have evidently been worked for a very long period. Some of the hills in the neighbourhood are honeycombed with old excavations; and the heaps of slag from the furnaces have accumulated in the course of time, until they now form a range of hillocks several hundred feet in length and from 30 to 40 feet high.

History, &c.—Shaikháwati is politically a confederacy of petty Rájput chieftains, bound to each other and to their common overlord at Jaipur by the ties of clanship. The Shaikháwats are a sept of that Kachwáha clan whose head is the Mahárájá of Jaipur or Amber. They derive their name from Shaikhjí, the grandson of Balájí, who was a

younger son of the Mahārājā of Jaipur in 1389 A.D., and received a portion of this territory in appanage. Shaikhji was so called from a famous Musalmān saint named Shaikh Burhān, whose shrine near Achrol is still regarded with veneration, and whose prayers had been successfully invoked by Shaikhji's father for the birth of a son and heir. In commemoration of this incident, every Shaikhāwat boy wears for two years from his birth the Musalmān *badūd* or threads, as well as the blue tunic and cap; and the Shaikhāwat sportsmen never hunt the wild hog or touch its flesh, although by other Rājputs it is commonly eaten once a year. Moreover, although the lands surrounding the saint's *dargah* belong now to the demesne of the Jaipur Mahārājā, the *dargah* itself is a sanctuary, and rent-free lands are held by about a hundred families descended from Shaikh Burhān. Shaikhji's father and grandfather had paid as tribute to the Mahārājā all the colts reared on their land; but Shaikhji so enlarged his power that for some generations the lords of Shaikhāwati became independent of the parent State.

From Shaikhji's great-grandson, Rāi Sīl, are descended the chieftains of Southern Shaikhāwati, who hence have always been known as Rāisilots; and from a younger son of Rāi Sīl are descended the principal chieftains of Northern Shaikhāwati, called the Sādhānis. The chief settlement of the Rāisilots, and the most important principality of Shaikhāwati, was at Khandela; whilst the early seat of the Sādhānis was at Udaipur, another town of this territory, not to be confounded with the capital of Mewār. There have been, and still are, many other branches of the family, between whom feuds, conquests, and reconquests have been interminable. Rāi Sīl himself became chief both of Khandela and of Udaipur by the help of the Delhi Emperor; and he is mentioned in the *Ain-i-Akbarī* as a *mansabdar* of 1250 horse under Akbar. After the fatal battle of Merta, in 1754, had laid Rājputāna prostrate at the feet of the Marāthās under De Boigne, Shaikhāwati suffered severely from their ravages; most of the towns were sacked, the capital, Khandela, being saved from that fate only by heavy payment. Later on, it was the scene of some of the exploits of the famous adventurer George Thomas, who was called in by a chief of Khandela to aid him against Jaipur. Finally, however, the Shaikhāwat chieftains acknowledged the suzerainty of Jaipur, though the bond seems never to have been very close. The leading chiefships are those of Sikar and Khandela, Khetri, and Kotputli.

The custom of equal division on succession to land in Shaikhāwati is similar to that which prevails in Malāni, a dependency of Jodhpur that holds much the same kind of relation to its parent State that Shaikhāwati does to Jaipur; and therein the custom differs from that prevalent elsewhere throughout Rājputāna, where the eldest son suc-

ceeds. The custom, however, does not appear to extend to the larger estates and chiefships in Shaikhāwati.

Shaikh Budin (*Shekh Budin*).—Hill sanatorium (so called from the shrine of a famous Muhammadan saint, Shaikh Bahā-ud-dīn, which crowns its summit) in Bannu (Bunnoo) and Dera Ismāil Khān Districts, Punjab, lying in lat. $32^{\circ} 17' 48''$ N., and long. $70^{\circ} 50' 48''$ E., on the border of the two Districts, and jointly administered by the Deputy Commissioners of both Districts. Elevation above sea-level, 4516 feet. Distant from Dera Ismāil Khān town 40 miles north, from Bannu town 64 miles south. The sanatorium crowns a bare limestone rock, which rises abruptly from the low range of Mohar, whose highest point it forms. A few stunted wild olives and acacias compose the only vegetation on the shadeless slope. The heat is frequently excessive, the thermometer ranging inside a bungalow from 88° to 94° F., though mitigated from June to October by a cool south-western breeze. This drawback, combined with the want of sufficient water-supply and the paucity of building sites, renders Shaikh Budin a very inadequate sanatorium. Persons who go up in good health are seldom attacked by illness; but the climate is not bracing enough for constitutions which require a radical change.

Shaikhpurā.—Town in Monghyr District, Bengal. Lat. $25^{\circ} 8' 30''$ N., long. $85^{\circ} 53' 11''$ E. Population (1881) 12,517, namely, males 5945, and females 6572. Hindus number 8411, and Muhammadans 4106.

Shakargarh.—*Tahsil* of Gurdāspur District, Punjab; comprising the whole trans-Rāvi portion of the District, except Narot *fargand*. Area, 501 square miles; towns and villages, 709, houses, 29,592; resident families, 47,508. Total population, 219,511, namely, males 114,617, and females 104,894. Classified according to religion, Hindus number 109,241; Muhammadans, 105,176, Sikhs, 5090; and Christians, 4. Average density of population, 438 persons per square mile. Of the 709 villages and towns, 594 contain less than five hundred inhabitants; 83 between five hundred and a thousand, and 32 between one thousand and five thousand. The average annual area under cultivation for the five years ending 1881–82 is returned at $323\frac{1}{2}$ square miles, or 207,079 acres, the principal crops being—wheat, 76,457 acres; barley, 48,198 acres; rice, 11,623 acres, Indian corn, 8523 acres; *moth*, 7009 acres, *javār*, 6899 acres, *kajra*, 2848 acres; gram, 2687 acres; sugar-cane, 9519 acres, cotton, 5783 acres; tobacco, 1151 acres, and vegetables, 1723 acres. Revenue of the *tahsil*, £27,783. The administrative staff consists of a *tahsildār* and a *munsif*, who preside over 1 criminal and 2 civil courts; number of police circles (*thānis*), 3; regular police, 48 men; village watch or rural police (*chaukidārs*), 673.

Shakargarh.—Town and fort in Pesháwar District, Punjab.—*See* SHABKADAR.

Shálamár (*Sháhlímár*).—Gardens and pleasure-ground in Lahore District, situated 4 miles east of Lahore city. These gardens were laid out in 1667 by Alí Mardán Khán, the celebrated engineer of Sháh Jahán, in imitation of the garden planned by the Emperor Jahángír at the sources of the Jehlam (Jhelum) river in Kashmir (Cashmere). The garden consisted of seven divisions representing the seven degrees of the Paradise of Islám, of which only three are included in the present area of about 80 acres, the remainder having fallen into decay. In the centre is a reservoir bordered by an elaborately indented coping and studded with pipes for fountains. A cascade falls into it over a slope of marble corrugated in an ornamental carved diaper. During the troublous times of Ahmad Sháh the gardens were neglected, and some of the decorative works were defaced and removed. Ranjít Singh restored them; but at the same time he laid ruthless hands upon the marble pavilions of the central reservoir, using them to adorn the Rámbágh at Amritsar, and substituting structures of brick and whitewash in their stead. The Shálamár Gardens are a favourite resort for fêtes and picnics, and the luxuriant foliage of the mango and orange trees lends itself with admirable effect to illuminations.

Sháli.—Hill in Bhajji State, Simla District, Punjab. Lat. $31^{\circ} 11' N.$, long. $77^{\circ} 20' E.$ Described by Thornton as rising in a steep and almost inaccessible peak 4 miles south of the Sutlej (Satlaj), and containing on its summit a wooden temple where human sacrifices were formerly offered to the goddess Káli. Elevation above sea-level, 9623 feet.

Shalvari.—Town in Dhárwár District, Bombay Presidency; situated 32 miles east by north of Dhárwár town. Population (1872) 5220; not separately returned in the Census Report of 1881.

Shami.—Town in Rádhanpur State, Bombay Presidency; situated on the river Saraswatí, in lat. $23^{\circ} 41' 15'' N.$, and long. $71^{\circ} 50' E.$ Population (1881) 5306, namely, Hindus, 2592; Muhammadans, 2173; and Jains, 541.

Shámli.—North-western *tahsil* of Muzaffarnagar District, North-Western Provinces; comprising a level upland, traversed throughout by the Eastern Jumna Canal, whose distributaries extend over every part of its surface. Area, 461 square miles, of which 268 square miles are cultivated. Population (1881) 202,233, namely, males 108,479, and females 93,754. Hindus number 139,522; Muhammadans, 61,262; Jains, 1439; and 'others,' 10. Average density, 438.7 persons per square mile. Of the 253 villages and towns, 146 contain less than five hundred inhabitants; 59 between five hundred and a thousand; 43 between one and five thousand; and 5 upwards of five thousand inhabitants. Land revenue, £32,099; total Government revenue,

£37,548; rental paid by cultivators, £71,239. The *tahsil* comprises the five *pargands* of Shámli, Tháná Bháwan, Jhanjhána, Kairána, and Bidauli. In 1884 it contained 1 civil and 2 criminal courts; strength of regular police, 68 officers and men; rural police or village watch (*chaukidárs*), 424.

Shámli.—Town in Muzaffarnagar District, North-Western Provinces, and head-quarters of Shámli *tahsil*; situated in lat. $29^{\circ} 26' 45''$ N., and long. $77^{\circ} 21' 10''$ E., on the bank of the Eastern Jumna Canal, 24 miles west of Muzaffarnagar town, on a low unhealthy site. Population (1881) 7359, namely, Hindus, 5607; Muhammadans, 1664; and Jains, 88. The town contains a handsome *bázár*, and carries on a considerable trade with the Punjab, consisting of exports of sugar and imports of salt. The place was originally known as Muhammadpur Zanárdár, but derives its present name from one Shám, who built a market in Jahángir's reign. Held in 1794 by a Maráthá commandant, who fell under suspicion of intriguing with the Sikhs. Lakwa Dáda, the Maráthá governor, despatched George Thomas against the commandant. Thomas stormed the town, and cut to pieces the suspected parties. In 1804, Colonel Burn was surrounded at Shámli by an overwhelming force of Maráthás, but escaped from a desperate position through the opportune advance of Lord Lake. During the Mutiny of 1857, the native *tahsildár* held the town bravely for the British, but fell at last gallantly defending his post against the insurgents of THANA BHAWAN. Police station, post-office. A small house-tax is raised for police and conservancy purposes.

Shámsábád.—Town in Farukhábád District, North-Western Provinces; situated in lat. $27^{\circ} 32' 15''$ N., and long. $79^{\circ} 28' 40''$ E., on the south bank of the Buri Gangá river, 18 miles north-west of Fatehgarh town. Population (1881) 8271, namely, Hindus, 4467; Muhammadans, 3800; and Jains, 4. The town is composed of 33 *muhallas* or wards, which are divided into scattered groups by patches of cultivation. The wards consist as a rule of great clusters of mud huts, surrounding a few large brick houses or hemming in a road. The principal thoroughfare is a long brick-paved street of mixed dwellings and shops, from which branch many narrow lanes. A small grain market opens on the south into a larger market-place, shaded by fine tamarind and *nlm* trees. Shámsábád is no longer the seat of any important trade or manufacture; but prior to the introduction of English cloth, it was noted for its fine textures, known as *mítha* and *jhuna*. Police station, post-office, school, and *sardí* (native inn). A small house-tax is raised for police and conservancy purposes.

Shamsha (or *Shimshupa*, also called the *Kudamla* and the *Kudabakola*).—Tributary of the Káveri (Cauvery) river, in Mysore State. It rises in lat. $13^{\circ} 25'$ N., long. $77^{\circ} 15'$ E., in Túngkúr District near

Deveráy-durga, and flows in a southerly direction to join the Káveri, in lat. $12^{\circ} 19' N.$, long. $77^{\circ} 18' E.$, just below the falls of Sivasamudaram, in Mysore District. In Túngkúr District its waters are utilized to form the great Kadaba tank; and in Mysore District it is crossed by a dam or anicut 9 miles above Maddúr. This anicut has recently been rebuilt by the Public Works Department of hewn stone. It feeds the Maddúr tank, and supplies irrigation channels 12 miles in length, capable of irrigating 2240 acres, and yielding a revenue of £671.

Shámsherganj.—Village in Sylhet District, Assam; situated in lat. $24^{\circ} 43' N.$, and long. $91^{\circ} 34' E.$ There is a considerable river trade, the exports being—rice, oil-seeds, molasses, *sítalpáti* and bamboo mats; and the imports—piece-goods, pulses, spices, and tobacco.

Shanor.—Petty State of the Sankheda Mehwrás group, Rewá Kántha, Bombay Presidency. Area, $11\frac{1}{2}$ square miles, containing 6 villages. Estimated revenue, £1013, of which £135 is paid as tribute to the Gáekwár of Baroda. The chief is a younger branch of the Mándwa family.

Shápur.—Petty State of the Hallár *prant* or division of Káthiáwár, Bombay Presidency.—See SHAHPUR.

Sháradánadí (or *Anakapalli*).—River in Vizagapatam District, Madras Presidency. Rises in the Mádgula Hills, and flowing south-west past Anakapalli and Kásimkota, enters the sea at Wattada. It is much used for irrigation, being crossed by six large anicuts. The total length of the river is about 45 miles.

Shárákpur.—*Tahsíl* of Lahore District, Punjab, comprising the whole trans-Rávi portion of the District. Area, 887 square miles; towns and villages, 379; houses, 21,002; families, 25,033. Total population, 121,451, namely, males 66,485, and females 54,966. Classified according to religion, Muhammadans number 97,244; Hindus, 16,993; Sikhs, 17,210; and Christians, 4. Average density of population, 137 persons per square mile. Of 379 towns and villages, 316 contain less than five hundred inhabitants, 48 between five hundred and a thousand, and 15 between one and five thousand. Principal crops—wheat, barley, rice, Indian corn, gram, and cotton. Revenue of the *tahsíl*, £11,619. The administrative staff consists of a *tahsildár* and *munsif*, presiding over 1 criminal and 2 civil courts; number of police circles (*thánds*), 2; regular District and town police, 51 men; village watch or rural police (*chaukidárs*), 102.

Sharákpur.—Town in Lahore District, Punjab, and head-quarters of Sharákpur *tahsíl*; situated in lat. $31^{\circ} 27' N.$, and long. $74^{\circ} 6' E.$, west of the Rávi, and on the bank of the river Degh. Population (1881) 4595, namely, Muhammadans, 3853; Hindus, 546; and Sikhs, 196. Municipal income (1883–84), £345, or an average of 1s. 6d. per head. The town is surrounded by a high and thick mud wall, intersected by

streets paved with brick. The public buildings include the Sub-divisional courts and offices, police station, school-house, and dispensary. The best rice produced in the District is grown in the neighbourhood of this town, on land irrigated from the Degh. Sharakpur is the only town of any importance in the trans-Rávi tract of Lahore, and the centre of a considerable trade in local produce.

Sharavati ('*The Arony*').—River of Southern India, which rises in lat. $13^{\circ} 44' N.$, long. $75^{\circ} 11' E.$, at Ambu-tirtha in Shimoga District, Mysore State; flows in a north-westerly direction through the District of Shimoga, and after breaking through the line of the Western Gháts by a sheer leap of 830 feet over the magnificent Falls of Gersoppa into a pool 350 feet deep, falls into the sea at Honáwar in the Bombay District of North Kánara. In Shimoga District, the stream is crossed by 70 anicuts or dams, from which irrigation channels are drawn having an aggregate length of 26 miles.

Sharretalai.—*Táluk* or Sub-division of Travancore State, Madras Presidency. Area, 129 square miles; containing 38 *karas* or collections of villages. Population (1875) 114,931; (1881) 113,704, namely, males 56,204, and females 57,500, occupying 29,662 houses. Density of population, 881 persons per square mile. Hindus number 83,580; Christians, 26,416; Muhammadans, 3706; and Jews, 2. Of the total Christians, Roman Catholics number 15,738; Syrians, 10,600; and Protestants, 78.

Sharretalai.—Chief town of the Sharretalai *táluk* of Travancore State, Madras Presidency; situated in lat. $9^{\circ} 41' 30'' N.$, and long. $76^{\circ} 23' 20'' E.$ Population (1871) 9228 (among whom are many Christians), dwelling in 2190 houses; not separately returned in the Census Report of 1881. The town contains a pagoda, which is the scene of an annual festival; and a Syro-Roman Church, built about 1550 A.D.

Shatal (*Shatul*).—Mountain pass in Bashahr (Bussahir) State, Punjab, on the road from Chuára to Kunáwar, over the southernmost ridge of the Himálayas. Lat. $31^{\circ} 23' N.$, long. $78^{\circ} 3' E.$ Mentioned by Thornton as dangerous on account both of the deep snow and cold wind. Elevation above sea-level, 15,555 feet.

Shegáon.—Town in Akola District, Berar, and a station on the Nágpur branch of the Great Indian Peninsula Railway, situated in lat. $20^{\circ} 48' N.$, and long. $76^{\circ} 46' E.$, 24 miles west of Akola town, and about 11 miles from Bálápur and Khámgaon. Population (1881) 11,079, namely, males 5753, and females 5326. Hindus number 9894; Muhammadans, 1062; Jains, 72; Christians, 41; Pársís, 7; and Jews, 3. Before the opening of the railway in 1863, Shegáon had little commerce; but considerable supplies of cotton have of late been brought to the market here instead of to Khámgaon. There are several cotton presses, some under European superintendence.

Travellers' bungalow, *sarâi* (native inn), and police station; Government school, and post-office.

Shekhâwati.—Province or Division of Jaipur State, Rájputána.—*See* SHAIKHAWATI.

Shekh Budin.—Sanatorium and mountains in Derâ Ismâil Khân and Bannu Districts, Punjab.—*See* SHAIKH BUDIN.

Shekohpura.—Ancient town in Háfizábád *tahsil*, Gujránwála District, Punjab; situated on the road between Háfizábád and Lahore, 22 miles from the former town. Contains a ruined fort, built by the Emperor Jahángír. Prince Dára Shekoh, grandson of Jahángír, from whom the town probably derives its name, is said to have connected it by a cut with the Aik rivulet, and this cut now forms the main channel of the stream. Under Ranjít Singh, Shekohpura became the residence of one of his queens, Rání Ráj Kauran, better known as Rání Nakáyan, whose cumbrous brick palace still remains the most conspicuous object in the town. After British annexation, the headquarters of the District were fixed for a time at this spot, but since the removal of the civil station to Gujránwála, Shekohpura has possessed no importance of any sort, except as a resort for sportsmen. About two miles distant from the town, is a large tank surrounded by handsome flights of steps, with a three-storied *baradiri* in the centre. The tank, however—to fill which the cut from the Aik rivulet above mentioned was made—is dry, and indeed is said to have never had water in it. A lofty watch-tower stands beside the tank.

Shellá.—Petty State or confederacy in the Khásí Hills, Assam; presided over by four elective chiefs of equal authority, with the title of *redhaddárs*. Population (1881) 6032; revenue, £70. The natural products include oranges, pine-apples, and betel-nuts. Bamboos are worked into mats and baskets. Limestone is extensively quarried, and both coal and iron are found. Shellá has been for many years a station of the Welsh Calvinistic Mission, who maintain several schools in which English and vernacular are taught, and also a girls' school.

Shendamangalam.—Town in Námkal *táluk*, Salem District, Madras Presidency. Lat. 11° 40' 30" N., long. 78° 10' 20" E. Population (1881) 12,575, namely, males 5866, and females 6709, occupying 2268 houses. Hindus number 11,687; Muhammadans, 683; and Christians, 205. A considerable amount of iron is smelted here.

Shendúrjána.—Town in Amráoti District, Berar.—*See* SENDURJANA.

Shendurni.—Town in Khándesh District, Bombay Presidency; situated in lat. 20° 39' N., and long. 75° 39' E., 60 miles south-east of Dhulha, and 12 miles east of Páchora station on the Great Indian Peninsula Railway. Population (1881) 5644. Hindus number 4566; Muhammadans, 924; Jains, 128; Christians, 2; and 'others,' 24.

Shendurni was a grant made to the family priest of the Peshwá, Bájl Ráo. An annual Hindu fair is held here. Post-office.

Sheng-dha-wai (*Shin-da-we*).—A highly venerated pagoda in Tavoy District, Tenasserim Division, Lower Burma.—*See* SHIN-DA-WE.

Sheng-maw (*Shin-maw*).—Pagoda on Tavoy Point, Tenasserim Division, Lower Burma.—*See* SHIN-MAW.

Sheng-mút-tí (*Shin-mot-tí*).—The most famous pagoda in Tavoy District, Tenasserim Division, Lower Burma.—*See* SHIN-MUT-TÍ.

Shenkotta.—*Tiluk* or Sub-division of Travancore State, Madras Presidency. Area, 65 square miles, containing 70 *karas* or collections of villages. Population (1881) 30,477, namely, males 14,688, and females 15,789, occupying 8759 houses. Density of population, 469 persons per square mile. Hindus number 27,513; Muhammadans, 2145; Christians, 819. Of the Christians, Roman Catholics number 386; Protestants, 375; Syrians, 58.

Shenkotta.—Chief town of the Shenkotta *tíluk* of Travancore State, Madras Presidency; situated in lat. $8^{\circ} 59' N$, and long. $77^{\circ} 17' 45'' E$, on the main road from Trevandrum and the South Travancore ports, across the Gháts, to Tinneveli, from which place it is distant about 40 miles. Population (1881) 7882, inhabiting 2214 houses. Several coffee estates have been opened in the neighbourhood of Shenkotta, which is an important centre of trade.

Sheogáon.—Sub-division and town of Ahmadnagar District, Bombay Presidency.—*See* SHIVGAON.

Sheopur.—Town in Gwalior State, Central India.—*See* SEOPUR.

Sher.—River of the Central Provinces, rising in lat. $22^{\circ} 34' N$, long. $79^{\circ} 44' E$, near Khamariá in Seonf District, which, after a north-westerly course of 80 miles, falls into the Nerbada (Nerbudda), in lat. $23^{\circ} N$, long. $79^{\circ} 10' E$, near the centre of Narsinghpur District. It is spanned by a fine stone bridge at Soná Dongri in Seonf, which carries the Nágpur and Jabálpur road; and the Great Indian Peninsula Railway crosses it by a lattice girder bridge 8 miles east of Narsinghpur. Coal, but of no commercial value, has been found in the river-bed near Sihorá in Narsinghpur. Principal affluents—the Mácha, Rewá, and Barí Rewá.

Sheraingil.—*Tiluk* or Sub-division of Travancore State, Madras Presidency. Area, 143 square miles, containing 88 *karas* or collections of villages. Population (1881) 87,072, namely, males 42,193, and females 44,879, occupying 18,994 houses. Density of population, 609 persons per square mile. Hindus number 72,029; Muhammadans, 13,132; Christians, 1911. Of the Christians, Roman Catholics number 1828; Protestants, 49; Syrians, 34.

Sher Ali.—Port in North Kánara District, Bombay Presidency.—*See* SHIRALI.

Travellers' bungalow, *sardi* (native inn), and police station; Government school, and post-office.

Shekhawati.—Province or Division of Jaipur State, Rájputána.—*See* SHAIKHAWATI.

Shekh Budín.—Sanatorium and mountains in Derá Ismáíl Khán and Bannu Districts, Punjab.—*See* SHAIKH BUDIN.

Shekohpura.—Ancient town in Háfizábád *tahsil*, Gujránwála District, Punjab; situated on the road between Háfizábád and Lahore, 22 miles from the former town. Contains a ruined fort, built by the Emperor Jahángír. Prince Dára Shekoh, grandson of Jahángír, from whom the town probably derives its name, is said to have connected it by a cut with the Aik rivulet, and this cut now forms the main channel of the stream. Under Ranjít Singh, Shekohpura became the residence of one of his queens, Rání Ráj Kauran, better known as Rání Nakáyan, whose cumbrous brick palace still remains the most conspicuous object in the town. After British annexation, the headquarters of the District were fixed for a time at this spot; but since the removal of the civil station to Gujránwála, Shekohpura has possessed no importance of any sort, except as a resort for sportsmen. About two miles distant from the town, is a large tank surrounded by handsome flights of steps, with a three-storied *baradári* in the centre. The tank, however—to fill which the cut from the Aik rivulet above mentioned was made—is dry, and indeed is said to have never had water in it. A lofty watch-tower stands beside the tank.

Shellá.—Petty State or confederacy in the Khásí Hills, Assam; presided over by four elective chiefs of equal authority, with the title of *wadháddárs*. Population (1881) 6032; revenue, £70. The natural products include oranges, pine-apples, and betel-nuts. Bamboos are worked into mats and baskets. Limestone is extensively quarried, and both coal and iron are found. Shellá has been for many years a station of the Welsh Calvinistic Mission, who maintain several schools in which English and vernacular are taught, and also a girls' school.

Shendamangalam.—Town in Nánkal *táluk*, Salem District, Madras Presidency. Lat. 11° 40' 30" N., long. 78° 10' 20" E. Population (1881) 12,575, namely, males 5866, and females 6709, occupying 2268 houses. Hindus number 11,687; Muhammadans, 683; and Christians, 205. A considerable amount of iron is smelted here.

Shendúrjana.—Town in Amráoti District, Berar.—*See* SENDURJANA.

Shendurni.—Town in Khándesh District, Bombay Presidency; situated in lat. 20° 39' N., and long. 75° 39' E., 60 miles south-east of Dhulia, and 12 miles east of Páchora station on the Great Indian Peninsula Railway. Population (1881) 5644. Hindus number 4566; Muhammadans, 924; Jains, 128; Christians, 2; and 'others,' 24.

Shendurni was a grant made to the family priest of the Peshwá, Báji Ráo. An annual Hindu fair is held here. Post-office.

Sheng-dha-wai (*Shin-da-we*).—A highly venerated pagoda in Tavoy District, Tenasserim Division, Lower Burma.—See SHIN-DA-WE.

Sheng-maw (*Shin-maw*).—Pagoda on Tavoy Point, Tenasserim Division, Lower Burma.—See SHIN-MAW.

Sheng-mút-tí (*Shin-mot-tí*).—The most famous pagoda in Tavoy District, Tenasserim Division, Lower Burma.—See SHIN-MUT-TI.

Shenkotta.—*Táluk* or Sub-division of Travancore State, Madras Presidency. Area, 65 square miles, containing 70 *karas* or collections of villages. Population (1881) 30,477, namely, males 14,688, and females 15,789, occupying 8759 houses. Density of population, 469 persons per square mile. Hindus number 27,513; Muhammadans, 2145; Christians, 819. Of the Christians, Roman Catholics number 386; Protestants, 375; Syrians, 58.

Shenkotta.—Chief town of the Shenkotta *táluk* of Travancore State, Madras Presidency; situated in lat. 8° 59' N., and long. 77° 17' 45" E., on the main road from Trevandrum and the South Travancore ports, across the Gháts, to Tinneveli, from which place it is distant about 40 miles. Population (1881) 7882, inhabiting 2214 houses. Several coffee estates have been opened in the neighbourhood of Shenkotta, which is an important centre of trade.

Sheogáon.—Sub-division and town of Ahmadnagar District, Bombay Presidency.—See SHIVGAON.

Sheopur.—Town in Gwalior State, Central India.—See SEOPUR.

Sher.—River of the Central Provinces, rising in lat. 22° 34' N., long. 79° 44' E., near Khamará in Seon District, which, after a north-westerly course of 80 miles, falls into the Nerbada (Nerbudda), in lat. 23° N., long. 79° 10' E., near the centre of Narsinghpur District. It is spanned by a fine stone bridge at Soná Dongrí in Seon, which carries the Nágpur and Jabalpur road, and the Great Indian Peninsula Railway crosses it by a lattice girder bridge 8 miles east of Narsinghpur. Coal, but of no commercial value, has been found in the river-bed near Sihorá in Narsinghpur. Principal affluents—the Mácha, Rewá, and Bará Rewá.

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Sher All.—Port in North Kanara District, Bombay Presidency.—See SHIRALI.

Shergarh.—Town in Chhīta *tehsil*, Muttra (Mathūra) District, North-Western Provinces; situated in lat. $27^{\circ} 46' 40''$ N., and long. $77^{\circ} 39' 50''$ E., on the right bank of the Jumna (Jamunā), 8 miles north-east of Chhīta town. Population (1881) 4712. The town derives its name from a large fort, now in ruins, built by the Emperor Sher Shāh. The original *zamindārs* of Shergarh were Pathāns, from whom, with the exception of a small share held by a Muhammadan descendant of the old family, the estate passed by purchase to a wealthy banker, Seth Gobind Dās, and was devoted by him to the maintenance of the temple of Dvārakādīs at Muttra. A small house-tax is raised for police and conservancy purposes.

Shergarh.—Ruined village in Shahabād District, Bengal; situated in lat. $24^{\circ} 49' 45''$ N., and long. $83^{\circ} 46' 15''$ E., 20 miles south-west of Sisserim. This spot was selected by Sher Shāh as the site of a fortress soon after he had begun strengthening ROHRAS, which he abandoned on discovering the superior advantages of Shergarh.

Sherghātī.—Town and municipality in Gayā District, Bengal; situated at the point where the Grand Trunk Road crosses the Murahar, in lat. $24^{\circ} 33' 24''$ N., and long. $84^{\circ} 50' 28''$ E. Population (1881) 5862, namely, Hindus 3649, and Muhammadans 2213. Municipal income (1883-84), £112, all derived from taxation; average incidence, $4\frac{1}{2}$ d. per head. The town has declined in importance since the construction of the East Indian Railway. There are still to be found here the descendants of skilled artisans, workers in brass, wood, and iron. When Sherghātī formed part of the District of Rāmgarh it was known as a centre of crime, which led to the appointment of a special Joint Magistrate in 1814.

Sherkot.—Town in Bijnaur (Bijnor) District, North-Western Provinces; situated in lat. $29^{\circ} 19' 25''$ N., and long. $78^{\circ} 38' 10''$ E., on the bank of the Kho river. Population (1881) 15,087, namely, males 7428, and females 7659. Muhammadans number 10,213; Hindus, 4756; and Jains, 118. Sherkot was formerly the head-quarters of Dhāmpur *tehsil*, and is still the residence of a powerful Rajput family, owners of the Sherkot estate, whose handsome palace, with two Hindu temples attached, stands just outside the town on the north-west. The principal places of business are the Kotra and Sherkot *kāzīs*—the former a wide brick-paved roadway, standing on high ground, and flanked with good shops; the latter a long irregular and narrow street in which two carts can scarcely pass each other. The town has a considerable trade in sugar, and is noted for its manufacture of embroidered carpets. The public buildings include a police station, post-office, dispensary, Anglo-vernacular school, and *sarāi* or native inn. The police and conservancy arrangements of the town are provided for by a small house-tax, yielding about £400 annually.

Shermádevi (*Sheranmahádevi*).—Town in Ambásamudaram *táluk*, Tinneveli District, Madras Presidency; situated in lat. $8^{\circ} 40' 40''$ N., and long. $77^{\circ} 35' 13''$ E., on the Tímbraparni river, 12 miles west of Tinneveli. Formerly head-quarters of the *táluk* of the same name; at present residence of the Head Assistant Collector of the District. Population (1881) 7624; number of houses, 1738. Hindus number 7191; Muhammadans, 61; and 'others,' 372.

Sheroda.—State in Káthiáwár, Bombay Presidency.—See **SHIRODA**.

Sherpur.—Town in Zamániah *tahsil*, Gházipur District, North-Western Provinces; situated in lat. $25^{\circ} 34' 40''$ N., and long. $83^{\circ} 50'$ E., on a large island formed by the Ganges, 10 miles east of Gházipur, and 17 miles north-west of Zamániah town. Population (1881) 9030, namely, Hindus 8756, and Muhammadans 274. Number of houses, 1787. Although returned as one town in the Census, Sherpur itself is divided into two parts, and also includes three outlying agricultural villages. Village school.

Sherpur.—Town and municipality in Bogra District, Bengal. Lat. $24^{\circ} 40' 20''$ N., long. $89^{\circ} 28' 20''$ E. Population (1881) 3991, namely, Hindus 2712, and Muhammadans 1279. Municipal income (1883–84), £390, of which £298 was derived from taxation; average incidence of taxation, 1s. 8½d. per head. Though the number of Hindus is so great, the town is surrounded on all sides by Muhammadan places of worship, which are held in much esteem. The proportion of brick-built houses is unusually large, and the principal landholders of the District reside here. But it is as a place of historical interest that Sherpur is most deserving of notice. It is mentioned in the *Ain-i-Akbari*, 1595 A.D., as the site of a fort called Salimnagar, in honour of Salim, the son of Akbar, afterwards famous as the Emperor Jahángír. It also figures in the writings of other Muhammadan historians as an important frontier post, previous to the conquest of South-Eastern Bengal, and the establishment of the Government at Dacca. These writers always refer to the place as Sherpur Murchá, to distinguish it from another Sherpur in Maimansingh; and it is marked on Van den Broucke's Map (1660) as 'Ceerpoor Mirs.' Rájá Mán Singh, Akbar's Hindu general, is said to have built a palace at Sherpur; and it is very probable that he would make use of so convenient a centre, from which to dominate Southern Bengal, and particularly Jessor, which then included a large part of the present District of Pabná, and was held by the rebel *raimúddár*, Rájá Pratápáditya, against whom Man Singh specially directed his arms.

Sherpur.—Town and municipality in Maimansingh District, Bengal. Lat. $25^{\circ} 0' 58''$ N., long. $90^{\circ} 3' 6''$ E.; lies between the rivers Shírl and Mirghí, about half a mile from the former and 1 mile from the latter, 9 miles north of Jamalpur. Population (1881) 8710, including the

suburbs of Náráyanpur and Barukpára. Muhammadans number 4467; Hindus, 4161; and 'others,' 82. Municipal income (1883-84), £456, of which £383 was derived from taxation; average incidence of taxation, 10½d. per head. There is no water carriage to the town, and even water for drinking and household purposes is obtained solely from tanks. Sherpur contains a fine Hindu temple; its buildings in general are in bad repair, and the place has a decayed and neglected appearance. Police station, post-office, *munsif's* court, and a good school. Considerable river trade. In 1876-77, the registered exports comprised 27,100 *maunds* of jute (mostly sent to Náráyananj), 35,100 *maunds* of rice and paddy, and 30,600 *maunds* of mustard seed; the imports included European piece-goods, valued at £5770, and 1200 *maunds* of betel-nuts. Owing to an alteration in the system of trade registration, no later statistics are available. A weekly newspaper, the *Charu Bartta*, is published at Sherpur, the proprietor being one of the leading Hindu *zamíndárs*.

Sherpur.—Sub-division and town of Khándesh District, Bombay Presidency.—See SHIRPUR.

Sher Sháh.—Large village in Múltán District, Punjab; situated in lat. 30° 6' 45" N., and long 71° 20' E., upon the Chenáb river. Until the opening of the Indus Valley State Railway in 1879, Sher Sháh was the terminus of the line from Múltán, and the port of the steam flotilla that plied to Karáchi (Kurrachee).

Shervaráyar Malai.—Hills in Salem District, Madras Presidency.—See SHEVAROY.

Shetrunja (Satrunjaya).—Place of Jain pilgrimage in Pálitána, Gujarát, Bombay Presidency.—See PALITANA TOWN.

Shevaroy.—Hill range in Salem District, Madras; situated between 11° 43' and 11° 55' N. lat., and between 78° 13' and 78° 24' 30" E. long. The hills occupy a total area of 151·67 square miles, with a plateau of about 20 square miles; a high plateau (Yercaud) on the southern portion of the eastern block of about 10 square miles; and plateaux (Púliyúr and Nagalúr) on the east and west sides of the Green Hills. The last-named form the western portion of the Shevaroy, and are separated from the eastern portion by the valley of the Vanniar. Average elevation, 4500 feet; highest point in the Green Hills, 5410 feet above the sea. The total population of the hills was returned in 1881 at 10,513.

Three regular *gháts* or passes lead to the table-lands—(1) the Salem *ghát*, on the south, which commences at the fifth milestone from Salem, about 5½ miles long, is the favourite *ghát* pass, as coolies are more easily obtained; it is in some parts very steep: (2) the Ahtúr *ghát* commences at the Shevaroy Hills station on the Madras Railway south-west line; the distance by it to Yercaud is about 11 miles: (3) the

Mallápuram *ghát* on the north; distance from Mallápuram station on the Madras Railway south-west line to Vercaud, about 19 miles. This *ghát* is of easy gradient for the first 9 miles, but very steep in its ascent to the Nagalúr plateau. Besides these well-known *gháts*, the hills are accessible by footpaths from many other points.

The native inhabitants of the plateau and slopes consist of Vellálar or Malayális. (*See SALEM DISTRICT.*) Their former mode of cultivation was *kumári* or nomádic tillage, which consists in clearing and burning a piece of forest or jungle, after which the soil is turned up with a hoe and sown; the next year this land is abandoned for a fresh spot. This system, however, has been put a stop to by the Forest Department, as it was extremely destructive. The number of Malayális inhabiting the hills is not known, but they are supposed to be increasing, looking to the amount of revenue received from them.

Monumental remains are common, and consist of cairns or cromlechs, much resembling those found on the Nilgiris. The present inhabitants have no traditions relating to them.

The vegetation does not differ materially from that of other hill ranges of Southern India. The base of the Shevaroy mountains is covered with the common forms of vegetation found in the adjoining low country. The middle region is clothed with a zone of bamboo jungle, which ascends to a height of about 3000 feet, where it abruptly terminates. Teak, blackwood, and sandal-wood are also found, in favourable situations, up to this elevation. The teak, in a stunted form, is met with on the mountain plateau at an elevation of 4500 feet. The soil and climate seem to be peculiarly adapted for gardening operations. Among imported plants which thrive readily may be mentioned the pear, loquat, peach, apple, guava, strawberry, plantain, citron, orange, lime, lemon, and Brazil cherry. The Australian acacias, eucalyptus, and the casuarina grow; the silk oak (*Grevillea robusta*) flourishes. Cinchona has been introduced, and is thriving. The coffee-plant was naturalized in these hills about forty years ago by Mr. Cockburn, late of the Madras Civil Service; and in 1883 the total area taken up by planters was about 10,000 acres, of which, however, only about one-half was cultivated. The number of coffee plantations is nearly 300. The tea-plant grows luxuriantly, though it has not yet (1883) been cultivated with a view to the manufacture of tea. Oranges are common, especially the Seville and sweet varieties. The lemon, lime, and shaddock succeed equally well.

The most common animals are the leopard, bear, wild hog, jungle-sheep, mouse-deer, hyæna, jackal, jungle-cat, hare, etc. Tigers are sometimes met with. A few bison exist on the neighbouring hills, but of late years have not been seen on the Shevaroy. Among birds may be mentioned the jungle and spur fowl, partridge, quail, wild pigeon,

woodcock, and snipe. Cobras, vipers, scorpions, and centipedes are seldom found.

When the Shevaroy's first began to attract notice forty years ago, the Government revenue derived from the whole of the hill villages was £35 yearly, which by 1883 had increased to upwards of £800. The great present want is a cart road from Salem, and the improvement of the interior roads. The revenue from coffee land is about £500, and from land under native cultivation, £300. A small detachment of police from Salem District is stationed on the hills. A Deputy *tahsildár* resides at Yercaud, and the Salem *munshif* visits the place once every three months to decide suits. There are European residents at Yercaud, and visitors resort to the station for the hot weather and holidays; accommodation is scarce. Church, post-office, dispensary, reading-room, club, and hotel.

The principal localities on the Shevaroy's are Yercaud, the Green Hills, Nagalúr, Púliyúr, Púttipádi, Maramangalam, and the Talasholay spur.

YERCAUD (Yerkádu) is the oldest and largest European settlement in the hills. It is situated on that portion of the plateau nearest to the town of Salem. The land in the valleys is undulating, and a great portion of it is already under coffee cultivation. The hill peaks are for the most part bare of soil, and the steep slopes are covered with low jungle.

The Green Hills are higher than any other portion of the range, and vary from 4500 to 5400 feet above sea-level. They differ much in appearance from any other portion of the Shevaroy's. The tops of the hills are rounded, and covered only with grass and low stunted shrubs; the ravines are wooded, as on the Nilgiris (Neilgherries). The rounded and undulating appearance of this portion of the Shevaroy's contrasts markedly with the rugged peaks and wooded slopes about Yercaud. This difference is due chiefly to the Green Hills being capped with laterite, in some places of considerable thickness. Several coffee plantations have been opened by Europeans and Eurasians upon the Green Hills; and there is a fine expanse of table-land, partly under cultivation by the hill tribes, which has been pointed out as a site well adapted for a sanitarium for European troops. This site occupies about 250 acres of land, and appears to be eminently suited for building.

The Shevaroy range possesses a very equable climate. Partaking as it does of both monsoons, the rainfall is considerable, being an annual average of from 65 to 70 inches, or double that of the rainfall on the surrounding plains. The moisture of the air is tolerably constant during the year. In a room without fire, and with open windows, the thermometer seldom stands below 65° F., and rarely

rises above 75° F. in the hottest months. A malarious type of fever occasionally prevails, but it is chiefly confined to the planters and others who live in, or visit, the jungles at the lower elevations. It is not improbable that some forms of disease, which are aggravated by the climate of the Nilgiris, may be treated with benefit on the Sheva-roys, such as rheumatism, affections of the liver, bowel complaints, etc.

Shiár.—Mountain pass in Bashahr (Bussahir) State, Punjab, over a southward spur of the Himálayas, which bound Kunáwár to the south. Lat. 31° 19' N., long. 77° 58' E. (Thornton). Magnificent prospect from the summit, embracing the Chor Mountain and the peaks of Jamnotri. Elevation above sea-level, 13,720 feet.

Shibi (Sibi).—Village in Túmkúr District, Mysore State; 15 miles north of Túmkúr town. Population (1881) 177. Celebrated for a temple of Vishnu, after his name of Nara-sinha, erected by three brothers in the beginning of this century. It is a plain structure, surrounded by a high stone wall. The annual festival, held for 15 days from the full moon in the month of Mágh, is attended by 10,000 people, and supplies the occasion for a great deal of trade.

Shidhpur.—Town in Baroda State.—*See* SIDHPUR.

Shi-gun.—Village in the Ta-pun township of Henzada District, Pegu Division, Lower Burma. Station on the Irawad State Railway. Population (1878) 1789; not returned separately in the Census Report of 1881.

Shikárpur.—British District in Sind, Bombay, lying between 27 and 29° N. lat., and between 67° and 70° E. long. Bounded on the north by Balúchistán, the Upper Sind Frontier District, and the river Indus; on the east by the Native States of Baháwalpur and Jaisalmir (Jeysulmere); on the south by Khairpur State and the Sehwaín Sub-division of Karáchi (Kurrachee) District; and on the west by the Khirthar Mountains. Area, 10,001 square miles. Population (1881) 852,986. The District comprises the 4 Sub-divisions of ROHRI, SUKKUR, LARKHANA, and MEHAR. The administrative head-quarters are at SHIKARPUR TOWN, which is also the most populous place in the District; but their transfer to Sukkur has been approved by Government, and will shortly take place.

Physical Aspects.—The general aspect of Shikárpur District is that of a vast alluvial plain, broken only at Sukkur (Sakkar) and Rohri by low limestone hills, which tend to preserve a permanent bank for the Indus at those places. Towards the west, in the Mehar and Larkhána Sub-divisions, rises the Khirthar range, with an extreme elevation of upwards of 7000 feet, forming a natural boundary between Shikárpur and Balúchistán. Large patches of salt land, known as *kalar*, occur frequently, especially in the upper part of the District; and towards the Jacobábád frontier, barren tracts of clay, and ridges of sandhills

covered with caper and thorn jungle, constitute a distinctive feature in the landscape. The desert portion of the Rohri Sub-division, known as the *Registhán*, possesses extensive sandhills, bold in outline and often fairly wooded. The forests of Shikárpur cover a total area of 207 square miles.

History.—The Districts of Upper Sind can hardly be said to have a history separate from that of the whole Province. Before the Muhammadan invasion, in 712 A.D., this portion of Sind was ruled by a Bráhma race, with their capital at Aror (or Alor), 5 miles distant from the modern town of Rohri. Shikárpur continued for some time a dependency of the Ummayid dynasty, and subsequently of the Abassides. In conjunction with the rest of Sind, it was conquered by Mahmúd of Ghazní, about 1025 A.D.; but his rule was of short duration, being replaced, about 1032, by the Súmra dynasty. The latter was succeeded in its turn by the Samma family, and thus again by the Arghúns; for an account of all of which, see the article on SIND.

Upper Sind does not come into any prominence till the accession to power of the Kalhora dynasty, in the early part of the 18th century. Previous to this, the country, which had been annexed in 1591–92 to the Delhi Empire by Akbar, was ruled by a succession of governors; and a powerful tribe, the Dáúdputras, had arisen and displaced the Mahars, an influential clan, whose chief town was then at Lakhi, 9 miles south-east of Shikárpur town. These Mahars had themselves some time before driven out the Jatois, a race of Balúchís, in a manner thus described by Captain (now Major-General) Sir F. G. Goldsmid, in his historical memoir of Shikárpur, written in 1854:—

‘There were seven brothers of the tribe (Mahars) in Ubauro, near the present Baháwalpur frontier, of whom one, by name Jaisar, not finding a residence with his near kindred to accord with his views of independence, turned his steps to Bukkur (Bakkar), then occupied by the noted Mahmúd, governor, under Sháh Beg Arghún, of the fort in 1541 A.D.

‘The Jatois, a race of Balúchís, held the country on the west bank of the river between Búrdika and Lárkhána. This included the town of Lakhi, then a flourishing place, so called from Lakhu, as Gosarji was from Gosar, and Adamji from Adam Jatoi. Jaisar crossed the river and took up his abode among the villages of this people. The Mahars and their new comrades disagreed; but the former had a friend at court, one Músa Khán Mehr, who was a man of influence with Mahmúd, and obtained the assistance of some hundred men to quell the disturbance, by asserting the rights of his own side. The consequence

country.

as a free

lapse of a

Government. The Jatois obtained the northern allotment, from Mehláni to Búrdika, on payment, however, of the customary land-tax. Jaisar Khán remained at Lakhi, which thus became, as it were, his property; and at his death, his son Akil, in conjunction with a brother, Bakkar, and a cousin, Wadera Suján Khán, determined on building a new town to replace the old one. The fort which they erected may still be traced. Suján also built a village called Marúlo, after his son Marú, now known as Wazirábád, from Sháh Walí, the Wazír of Ahmad Sháh Duráni, whose perquisite it in after years became.'

But the Mahars had to contend with the Dáúdputras, who were by profession both warriors and weavers. The results of the contest, and consequent foundation of the city of Shikárpur, are thus narrated by General Sir F. G. Goldsmid:—'The weavers (Dáúdputras) appealed to spiritual authority, as represented in the person of Pír Sultán Ibráhim Sháh, whose tomb still bears testimony to the fact of his existence. He was a holy man of eminence, and numbered the Mahars, as well as their opponents, among his disciples, and he moreover himself resided at Lakhi. He took up the cause of the appellants, and eventually obtained permission for them to resume their hunting in the Shikárgahs, from which they had been warned off by the Mahars. Again, however, they were stopped, and again did they seek the Pír for redress. The Mahars were summoned a second time, and ordered to desist. They remonstrated, and finally informed their venerable mentor that they would never spare the intruders till they had exterminated the whole body, or at least driven them from the vicinity of the Shikárgah, adding, "If you wish to be their comrade, good, be it so."

'Baffled and distressed, the Pír bethought him of the final resource in such cases. He invoked curses on the rebelling Mahars, and blessings upon the oppressed Dáúdputras. He told his *protégés* that they were as the iron sickle, and their enemies as grass or chaff, and promised them the victory in the event of an engagement. The plot prospered. The crisis drew on, and the battle became inevitable. According to the story of the sons of Dáúd, their ancestors on this occasion could only muster a force of 300 or 400 fighting men, while their opponents numbered 12,000. A sanguinary conflict ensued on the meeting of the hostile forces, which, after the most determined endeavours on either side, eventually terminated in favour of the Dáúdputras, who were left masters of the field. Strange to say, while some 3000 dead bodies of Mahars strewed the ground, but few were killed on the side of the victors. A vigorous pursuit succeeded this victory. It was known that the wealthy *samindárs* of Lakhi had *laks* of rupees concealed in that city. Thither went the Dáúdputras; and it is by no means unlikely that, on this particular occasion, they found

means of improving the condition of their financial and commissariat departments.

'The Pír received his successful pupils with as much mundane satisfaction as could be expressed by so holy a man. He congratulated them, and, mounting his palfrey,' continues General Goldsmid, 'he led the weavers to the scene of their exploits. He halted at the ground on which now stands the commercial capital of Upper Sind. Muttering some mysterious words, which immediately instilled a dramatic awe into the hearts of the bystanders, he raised his hand high in the air, and gracefully dropped an iron nail, which had long been held there unnoticed. The nature of the movement brought the point well into the earth. It remained transfixed in an admirable position for the chief performer of the play. He pointed to the instrument upon which all eyes were drawn. "Here," said the Pír, "let a city be built, and let it bear the distinguished name of Shikárpur!" The air rang with shouts, and the proceedings terminated in the usual manner on such occasions. The jungle was cut and cleared; neighbours were summoned, threatened, and cajoled, the work proceeded with vigour and rapidity, and by degrees a town appeared. The town in due course became a city, noted for the wealth and enterprise of its merchants, the size and business of its *bázár*, a hot-bed of intrigue, debauchery, bribery, oppression, evil-speaking, and many other kinds of corruption; and so passed away the years till the dawn of the 18th century.'

The Kalhoras had, during the 17th century, been gradually laying the foundation of their subsequent sovereignty in Sind, and the career of Yár Muhammad, the first ruler of this line, is thus described by Goldsmid.—'Mírza Bakhtawar Khán, son of Mírza Panni, was ruler of Siwi, and held a large tract on the west bank of the Indus, in the environs of Shikárpur. Yár Muhammad, associated with Rájá Likkí and Iltas Khán Brahúi, recommenced aggressive measures by a movement in the country bordering on the Manchhar Lake. He possessed himself of Saintáni, expelling the Panhwars and their head-man, Kaisar; and despatched his brother, Mír Muhammad, to extend his acquisitions by a diversion in an opposite quarter. His objects were achieved with skill and rapidity. His career of conquest made Iltas leave him. "You have no need of me, heaven is on your side; that suffices," said the rough Brahúi. Kandíáro and Lárkhána were taken, among less important places. The latter had been held by Málik Alá Bakhsh, brother of Bakhtawar. The Mírza, upon these reverses, appealed to the Sháhzáda in Múltán, Moiz-ud-dín (afterwards Jahándar Sháh), who no sooner heard the report than he turned to the scene of disturbance. Then Bakhtawar's heart misgave him, for he did not wish to see the country entrusted to his charge overrun by the troops of his master. He had probably private and particular reasons for the objection

unknown to the historian. He prayed the prince to withhold his march, and on the refusal of his request, had actually the audacity to oppose the advancing hosts. He was slain, and Moiz-ul-dín repaired to Bukkur. Yár Muhammad does not appear to have suffered severely for his offences; on the contrary, the Sháhzáda came gradually round to favour his views of aggrandizement. One after another, new governors were appointed for Siwi, which Province in course of time was handed over to the Wakils of the Kalhoras. Yár Muhammad received the imperial title of Khúda Yár Khán.'

The reigns of the several Kalhora princes will be found described in some detail in the section treating of the history of the Province. During the Talpur rule, various parts of Upper Sind, such as Búrdika, Rúpar, the town of Sukkur, and other places, which were dependencies of the Duráni kingdom, had, between the years 1809 and 1824, been gradually annexed to the possessions of the Khairpur Mírs, Sohráb, Rústam, and Mubárák. Shikárpur was the only spot that remained to Afghánistán; and that town eventually came into the peaceable possession of the Mírs in 1824, at a time when Abdúl Mansúr Khán was governor of the place, and when the Sikhs were said to be contemplating an attack upon it. Goldsmid thus refers to this circumstance in his memoir.—'Three or four months after the departure of Rahím Dil Khán, it began to be rumoured that the Sikhs were contemplating an attack upon Shikárpur. At this time the Chevalier Ventura was with a force at Derá Gházi Khán. The Mírs of Sind—Karam and Murád Ali of Haidarábád, and Sohráb, Rústam, and Mubárák of Khairpur—seeing that it would be of great advantage that they should at this juncture take the city into their own hands, deputed the Nawáb Wali Muhammad Khán Lughári to dispossess the Afgháns, and carry out the wishes of his masters. The Nawáb commenced by writing to Abdúl Mansúr several letters to the following effect:—

"Undoubtedly the Sikhs did wish to take Shikárpur, and were approaching for that particular purpose. Its proximity to the Mírs' possessions in Sind made it very inconvenient for them that it should fall into the hands of this people; moreover, the capture of the place, under the circumstances, would be disgraceful, or at least discreditable, and it was the part of wise men to apply a remedy in time when available. The Afghans were not in a position to oppose the coming enemy; their Sardárs in Khorasan were in the habit of eating superior mutton, Pesháwar rice, luscious grapes, raisins, delicious cold melons, seedless pomegranates, and rich comfits, and of drinking iced water; it was on account of this application of cold to the body that a martial and lordly spirit possessed them, which it is not the property of heat to impart. It was, moreover, necessary to the well-

being of their early consideration. 'While the army was coming from Khamsa, the city would glide from their hands.' A well-known Persian proverb was here judiciously interpolated, viz. On calling the closed fist to remembrance after the battle it will be necessary to let the blow fall upon one's own head. 'In fine, taking all things into consideration, how much better would it be for the Muz to occupy Shikarpur; they were Mohammedans as well as the Afghans. Once having driven away the Sikhs, and deprived the infidels of their dominions, Shikarpur was at no distance; let it then become the property of the Muslims. Now, in the way of kindness, let them (the Afghans) return to Khamsa, and join their comrades at table in discussing the *glans* and *brins*, whereby cure is obtainable of this most destructive *leues*.'

'Abdul Mansur Khan, upon receiving these communications, became greatly perplexed, and thought of returning to Khamsa. The Muz, much as they desired to take possession of the town, were obliged to content themselves with assembling an army without its walls, on the plea of protection against a Sikh invasion. They encamped in the *Shahi Bagh*. The Nawab sent for Juma Khan Bandukhi and through him opened fresh communications with the governor, and tried every artifice to persuade the latter to quit his post. Finding a bold stroke of diplomacy necessary, he urged that he would hold him responsible for the town revenues accruing after the date of the original proposition for transfer to the Muz. This argument had the desired effect; Abdul Mansur refused to refund but agreed to abandon Shikarpur. In this interval, Dilwar, Khilmitpur to the Nawab, entered the city, and coming to the house of Shukar Moya Ram, established his head-quarters there, and caused the change of Government to be notified throughout the *khair* and *seems*. The Muz' followers came gradually in, and at length were regularly installed, and obtained the keys of the eight *gates*.

'The next day, Abdul Mansur Khan at Juma Khan's instigation, visited the Nawab in the *Shahi Bagh*. The latter, after much flattery and compliment, gave him his dismissal. The ex-governor repaired with his effects to Garhi Yilm a town in the neighbourhood, and stayed there to execute some unfinished commissions. In a few days, the Nawab ordered him to depart from thence, which he did, and was soon far on his way to Kandahar. Wali Muhammad felt relieved, and applauded his own handiwork, in that he had won a bloodless victory. He had deprived the Afghans of a much-loved settlement and added it to the possessions of the Muz. The revenue was divided into seven shares; four became the property of the Muz of Hilmah, and three of their relations of Khilmitpur. Karam Shah was the new governor.'

In 1833, during the Talpur rule, Sháh Shúja, the dethroned Afghán monarch, made an expedition into Upper Sind to recover his lost territory. He marched with a force *via* Baháwalpur towards Shikárpur. He was met near Khairpur by Kazim Sháh, the former governor of Shikárpur, and escorted to the city with all honour, where he was to stay forty days and receive 40,000 rupees (£4000). But though he took the money, he did not leave at the appointed time. Public feeling in Sind ran high. Those who declared for the Sháh on the west bank were taken under his especial protection. He appointed local officials, and commenced legislating for his Sindian *protégés*, treating them in the light of subjects. The climax was a burst of indignation from the offended Mírs, and a rising of their Balúch retainers. A Balúch army, under Mírs Mubárák and Zangí Khán, crossed the river at Rohri, and took up a position at Sukkur, while Sháh Shúja despatched a force of 2000 men under his lieutenant, Samandhar Khán, to meet it. The Mírs had been drawn up near the Láláwáh Canal, which the Sháh's general attacked, throwing the Balúchís into instant confusion, and ultimately defeating them. This victory resulted in the payment to the Sháh by the Mírs of 4 *lakh*s of rupees (say £40,000), and 50,000 rupees (£5000) for his officers of State, while 500 camels were made over for the king's use. The Sháh subsequently marched on his expedition against Kandahár, but being defeated by Dost Muhammad, he retreated to Sind and proceeded to Haidarábád, where he obtained sufficient money from the Mírs to enable him to return to Ludhiána, in the Punjab.

In 1843, on the conquest of the Province by the British, all Northern Sind, with the exception of that portion held by the Khairpur Mír, Alí Murád Talpur, was formed into the Shikárpur Collectorate and the Frontier District. In the previous year (1842), the towns of Sukkur, Bukkur, and Rohri had by treaty been ceded to the British in perpetuity. In 1851, Mír Alí Murád Talpur of Khairpur was, after a full and public inquiry, convicted of acts of forgery and fraud, in unlawfully retaining certain lands and territories which belonged of right to the British Government. The forgery consisted in his having destroyed a leaf of the Kurán in which the Naunahar, concluded in 1842 between himself and his brothers, Mírs Nasir and Mubárák Khán, was written, and having substituted for it another leaf, in which the word 'village' was altered to 'district,' by which he fraudulently obtained possession of several large districts instead of villages of the same name. On 1st January 1852, the Governor-General of India (Marquis Dalhousie) issued a proclamation depriving the Mír of the districts wrongfully retained, and degrading him from the rank of *Raís* (or Lord Paramount). Of the districts so confiscated, Ubauro, Búldika, Mírpur, Saídábád, and other parts of Upper Sind on the left bank of the Indus,

now forming the greater part of the Rohri Sub-division, were added to the Shikárpur Collectorate.

Population.—The population of Shikárpur District, according to the Census of 1872, numbered 776,227; and according to that of 1881, 852,986, scattered over an area of 10,001 square miles, inhabiting 6 towns and 1367 villages, and dwelling in 137,702 houses. Total increase of population in the nine years, 76,759, or 9·88 per cent. The Census of 1881 gives the following results:—Persons per square mile, 85·2; villages per square mile, 0·13; persons per village, 621; and persons per house, 6·1. Classified according to sex—males number 461,033, and females 391,953; proportion of males, 54·05 per cent. Classified according to age, there were—under 15 years, boys 189,272, and girls 153,962; total children, 343,234, or 40 per cent.: 15 years and upwards, males 271,761, and females 237,990; total adults, 509,751, or 60 per cent. of the population.

As regards religious distinctions, Shikárpur is an essentially Muhammadan District, the Census showing a total of 684,275 Muhammadans, as against 93,341 Hindus. The Muhammadans include 679,132 Sunnis, 5142 Shiás, and 1 Wahábí. Divided into tribes, there were 132,301 Balúchís, 6539 Patháns, 13,158 Sayyids, 17,313 Shaikhs, 492,733 Sindhís, 22,231 'other' Muhammadans. The Hindus include 3336 Bráhmans, 271 Rájputs, 77,491 Loháns, and 12,243 'other' Hindus; 5892 are returned as aboriginal tribes; while 736 Christians, 64 Pársís, 9 Jews, 68,655 Sikhs, 6 Buddhists, and 8 Brahmins complete the total.

As regards occupation, the male population is divided by the Census into the following main groups:—(1) Professional class, including civil and military, 7124; (2) domestic servants, inn and lodging-house keepers, 5305; (3) commercial class, including bankers, merchants, carriers, etc., 8866; (4) agricultural and pastoral class, including gardeners, 165,440; (5) industrial class, including all manufacturers and artisans, 55,174; (6) indefinite and non-productive class, comprising general labourers, male children, and persons of unspecified occupation, 219,124.

Of the 1373 towns and villages in the District, 468 contain less than two hundred inhabitants; 431 between two and five hundred; 251 between five hundred and one thousand; 161 between one and two thousand; 43 between two and three thousand; 12 between three and five thousand; 3 between five and ten thousand; 2 between ten and fifteen thousand; and 2 between twenty and fifty thousand. The chief towns are—SHIKARPUR, population (1881) 42,496; SUKKUR, 27,389; LARKHANA, 13,188; ROHRI, 10,224; KAMBAR, 6133; and GARHI YASIN, 5541. The above-named six towns, together with GHOTKI, population 3240; RATO-DERO, 3170; UNAURO, 2267; MEHAR, 1944; and KHAIKARPUR NATHESHAH, are municipalities: total income (1883-84),

£28,488; incidence of taxation varied from 8½d. to 5s. 2½d. per head in different towns.

Agriculture.—Agriculture supported (1881) 465,522 persons, or 54·58 per cent. of the population; only 181,679 were agricultural workers. In 1883–84, in the Government villages of the District, 660,016 acres were cultivated land bearing assessment and in occupation; 336,354 acres were fallow; while 242,739 acres, though cultivable and assessed, were not in occupation. The area under actual cultivation was 579,527 acres, of which 113,715 acres were twice cropped. Cereals and millets occupied 512,570 acres, of which nearly half, or 234,617 acres, were under rice; pulses, 110,912 acres; orchards, 4235 acres, drugs and narcotics, 3460 acres, chiefly tobacco; sugar-cane, 726 acres; oil-seeds, 44,883 acres; indigo, 2780 acres; fibres, 7985 acres, nearly all under cotton; and 'other' products, 5691 acres. The prices of agricultural produce, per *maund* of 80 lbs., ruling during 1883–84, were as follows—wheat, 5s. 7d.; barley, 3s.; best rice, 6s. 10½d., common rice, 5s. 1d.; *bajra* (*Pennisetum typhoideum*), 3s. 3½d.; *jowar* (*Sorghum vulgare*), 3s. 1½d.; gram, 3s. 10d.; salt, 5s. 10d., flour, 6s. 6½d.; *dal* (split-peas), 6s. 4½d.; *ghi*, £2, 9s. 0½d. The wages of skilled labour were in the same period 2s. per day; of unskilled labour, 7½d. Cart hire, 2s. a day; camel hire, 5d. a day for baggage camels, and 1s. 0½d. a day for riding camels.

Natural Calamities.—In 1874, the Indus inundated a large portion of the District, breaching the railway and other embankments. The flood waters reached their greatest height from the 14th to 16th August, but began steadily to subside about the 27th of that month. No less than 536 villages were flooded, and several Government buildings were washed away. The floods of 1874 were from 5 to 8 feet higher than those which occurred in 1872. The net loss to Government in Mehar Sub-division alone was estimated at £15,000.

Commerce and Trade, etc.—The Sind, Punjab, and Delhi (now the North-Western State) Railway runs through the District, from Sita to Reti, for about 170 miles, with 22 stations, the principal ones being Radhan, Ruk junction, Sukkur, where it crosses the Indus to Rohri on the opposite bank, and Reti. The Sind-Pishin Railway, starting from Ruk junction, crosses the District boundary a little beyond Jacobabad, a distance of about 40 miles, with 4 stations. But the facilities for trade afforded by the railway have not materially affected the boat traffic on the Indus. The trade through the BOLAN Pass passes through the District, and the value is estimated at from £250,000 to £300,000, large quantities of wheat being sent to Karachi. The principal manufactures are carpets and coarse cotton cloth.

Administration.—The total revenue of Shikarpur District in 1882–83 amounted to £234,792. The land revenue collected was £189,868; stamps, £12,550; excise, £12,120; and licence-tax, £3800. The

local fund revenue was £13,920, while the 11 municipalities raised an income of £23,050. Shikarpur is administered by a Collector-Magistrate with assistants; the Civil and Sessions Judge has his head-quarters at Shikarpur town. In 1882-83, there were 6 civil judges and 39 stipendiary magistrates in the District; maximum distance of a village from nearest court, 40 miles; average distance, 6 miles. The police force numbered in 1882-83, 1091 officers and men, showing 1 policeman to every 7·5 square miles of area and to every 732 of the population. The police were maintained at a cost of £20,097. Schools (1882-83), 116, with 8104 pupils.

Medical Aspects.—The climate of Shikarpur District is hot and dry, with a remarkable absence of air-currents during the inundation season; and it is, in consequence, very trying to a European constitution. The hot weather commences in April, and ends in October; it is generally ushered in by violent dust-storms; the cold season begins in November, and lasts till March. The maximum, minimum, and mean temperatures in the shade are on an average 100°, 61°, 81° F. The average yearly rainfall, from the observations of 18 years ending 1881, is only 4·93 inches. The diseases are principally malarious fevers and ulcers. Cholera occurs at times, chiefly in the months of June and July. In 1883-84, 15,865 births were registered, and 13,450 deaths, or 15·77 per 1000. In the same year, 27,256 persons were vaccinated. [For further information regarding Shikarpur District, see the *Gazetteer of the Province of Sind*, by Mr. A. W. Hughes (London, George Bell & Co., 1876, second edition). Also Mr. Stack's *Memorandum upon the Current Land Revenue Settlements in the temporarily settled parts of British India*, pp. 532-543; the *Bombay Census Report* of 1881; and the several annual Administration and Departmental Reports of the Bombay Government.]

Shikarpur.—*Taluk* of the Sukkur (Sakkar) Sub-division, Shikarpur, Sind, Bombay Presidency. Area, 487 square miles. Population (1872) 73,383; (1881) 75,112, namely, males 40,600, and females 34,512; occupying 11,187 houses, in 1 town and 66 villages. Hindus number 19,483; Muhammadans, 43,944; Sikhs, 10,816; non-Hindu aborigines, 766; Christians, 96; Parsis, 6; Jew, 1. Area assessed for land revenue (1882-83), 37,409 acres, of which 31,007 acres were under cultivation. In 1883 the Sub-division contained 1 civil and 5 criminal courts; police circles (*thānis*), 6; regular police, 367 men. Land revenue, £9824.

Shikarpur.—Chief town of Shikarpur District, Sind, Bombay Presidency. Lat. 27° 57' 14" N., long. 68° 40' 26" E.; connected by good roads and railway with Jacobabad, from which it is distant 26 miles south-east, with Sukkur (Sakkar) 23 miles north-west, and Larkhāna 10 miles north-east. Situated in a tract of low-lying country, annually flooded by canals from the Indus, the nearest point of which

river is 18 miles west. The elevation of the town is only 194 feet above sea-level. Two branches of the Sind Canal—the Chhota Begári and the Ráiswah—flow on either side of the town, the former to the south, and the latter to the north. The soil in the immediate vicinity is very rich, and produces heavy crops of grain and fruit. Population (1881) 42,496, namely, males 22,889, and females 19,607. Hindus number 16,218; Muhammadans, 16,480; Christians, 70; Pársís, 4; and 'others,' 9724. Shikárpur is the head-quarters of the principal Government officials of the District, and contains the usual public buildings, and is a station on the Sind-Pishin State Railway. The total number of police is 311. Municipal revenue (1883-84), £6819; incidence of taxation, 2s. 9d. per head. The Municipal Act was brought into force in 1855, since which date great sanitary improvements have been effected. Before that time, Shikárpur was notorious for its unsightly appearance. The Stewartganj Market (so called after a popular District officer) is a continuation of the old *bázár*, and is a commodious structure. To the east of the town are three large tanks, known as Sarwar Khan's, the Gillespie, and the Hazári tank.

The trade of Shikárpur has long been famous, both under native and British rule. The town is situated on one of the great routes from Sind to Khorasán *viâ* the Bolán Pass, and its commerce in 1841 was thus described by Postans:—'Shikárpur receives from Karáchi, Márwár, Múltán (Mooltan), Baháwalpur, Khairpur, and Ludhiána—European piece-goods, raw silk, ivory, cochineal, spices of sorts, coarse cotton cloth, *kinkhabs*, manufactured silk, sugar-candy, cocoa-nuts, metals, *kirami* (groceries), drugs of sorts, indigo and other dyes, opium and saffron; from Kachhi, Khorasán, and the north-west—raw silk (Turkestan), various kinds of fruit, madder, turquoises, antimony, medical herbs, sulphur, alum, saffron, assafoetida, gums, cochineal, and horses. The exports from Shikárpur are confined to the transmission of goods to Khorasán through the Bolán Pass, and a tolerable trade with Kachhi (Bagh, Gandáwa, Kotri, and Dadar). They consist of indigo (the most important), henna, metals of all kinds, country coarse and fine cloths, European piece-goods (chintzes, etc.), Múltáni coarse cloth, silks (manufactured), groceries and spices, raw cotton, coarse sugar, opium, hemp-seed, shields, embroidered horse-cloths, and dry grains. The revenue of Shikárpur derivable from trade amounted in 1840 to Rs. 54,736 (say £5473), and other taxes and revenue from lands belonging to the town, Rs. 16,645 (say £1664), making a total of Rs. 71,381 (say £7138), which is divided among the Khairpur and Haidarabad Talpur Mírs in the proportion of three-sevenths and four-sevenths respectively.'

Since Postans wrote as above, Shikárpur has lost much of its commercial importance owing to the opening of the Indus valley

portion of the Sind, Punjab, and Delhi Railway. The returns furnished for the first edition of this work showed that in 1874 the imports of Shikárpur were valued at £264,190; the exports, £64,485. No later statistics are available. The principal manufactures are carpets and coarse cotton cloth. In the Government jail, *postins* or sheepskin coats, baskets, reed chairs covered with leather, carpets, tents, shoes, etc., are made by the prisoners. From Shikárpur there are three postal routes, viz. to Jacobábád, to Sukkur, and southwards to Lárkhána and Mehar. The town contains several vernacular schools, together with a high school.

Shikárpur.—Flourishing town in Bulandshahr District, North-Western Provinces; situated in lat. 28° 17' N., and long. 78° 3' 15" E., on the Rámghát road, 13 miles south-east of Bulandshahr town. Population (1881) 10,708, namely, males 5661, and females 5047. Hindus number 6203; Muhammadans, 4471; and Jains, 34. Several substantial houses, temples, and mosques. Great walled *sarái* (native inn), about 200 years old, through which the high-road passes. Founded about 1500 A.D. by Sikandar Lodí, as a hunting-lodge on a large scale, whence the town derives its name. An ancient mound, said to have been once known as Tálpat Nagari, is about 500 yards north of the town, with a remarkable building, called *Bíra Khamba*, or the Twelve Columns, containing 12 fine red-sandstone pillars, in the architectural style of the Emperor Jahángír. The earliest inscription records the name of Sayyid Fazl-ullá, son-in-law of the Emperor Farukhsiyár, with the date 1718. The town is surrounded by the ruins of an old fort. Residence of Chaudhri Lakshman Singh, an Honorary Magistrate, who was conspicuous for loyalty during the Mutiny in 1857. A small house-tax is raised for police and conservancy purposes.

Shikárpur.—*Táluk* in Shimoga District, Mysore State. Area, 418 square miles, of which 144 square miles are cultivated. Population (1881) 63,510, namely, males 32,609, and females 30,901. Hindus number 59,335; Muhammadans, 4161; and Christians, 14. Land revenue (1881-82), exclusive of local cesses, £16,193, or 4s. 10½d. per cultivated acre. Gross revenue, £18,679. Greatly overgrown with jungle, which gives shelter to many wild beasts. The most important crop and article of export is sugar-cane. In 1883 the *táluk* contained 1 civil and 1 criminal court; police circles (*thánds*), 7; regular police, 51 men; village watch (*chaukidárs*), 236.

Shikárpur.—Municipal village in Shimoga District, Mysore State; situated in lat. 14° 15' 40" N., and long. 75° 23' 30" E., near the right bank of the Choradi river, 28 miles north-west of Shimoga town. Headquarters of Shikárpur *táluk*. Population (1881) 3569; municipal revenue (1881-82), £144; rate of taxation, 9½d. per head. Said to have been originally called Maliján-halli, and subsequently Mahádanpur.

The present name was given in the time of Haidar Ali, on account of the abundance of game found in the neighbourhood. The old fort is now in ruins. A festival held for three days in April is attended by 8000 persons. Weekly fair on Saturdays.

Shikohábád.—South-western *tahsil* of Mánipuri District, North-Western Provinces. It is conterminous with Shikohábád *pargand*, and consists of an almost level plain, intersected by undulating sandhills, and much cut up by ravines along its southern border, where it abuts upon the river Jumna (Jamuna). The Sarsa river flows through the midst of the *tahsil*, and the East Indian Railway traverses it from end to end, with stations at Bhadan and Shikohábád. It is also thoroughly opened by good roads in every direction. Canal irrigation is afforded by the Bhognipur branch of the Ganges Canal. Area, 293 square miles, or 187,588 acres, of which $200\frac{1}{2}$ square miles, or 128,172 acres, were returned as under cultivation at the time of the last land revenue settlement of the District in 1870; 8845 acres were cultivable, including 2629 acres under groves; 1288 acres were held free of revenue; and 49,283 acres were uncultivable waste. Population (1881) 144,882, namely, males 79,316, and females 65,566. Average density, 494.5 persons per square mile. Hindus number 132,434; Muhammadans, 11,374; Jains, 1065; and 'others,' 9. Of the 284 towns and villages, 194 contain less than five hundred inhabitants; 63 between five hundred and a thousand; 26 between one and five thousand; and 1 between ten and fifteen thousand inhabitants. The principal crops are *báfra*, *jodr*, cotton, and sugar-cane for the *kharif*, and wheat, *bejhar*, barley, and gram for the *rabi* harvest. The former occupies about 60 and the latter 40 per cent. of the cultivated area. Land revenue (1882), £27,625, or including local rates and cesses, £30,958. In 1884, Shikohábád *tahsil* contained 1 civil and 1 criminal court, number of police circles (*thánás*), 2, regular police, 42 men; village watch or rural police (*chaukidárs*), 370.

Shikohábád.—Town in Mánipuri District, North-Western Provinces, and head-quarters of Shikohábád *tahsil*, situated in lat. $27^{\circ} 6' 5''$ N., and long. $78^{\circ} 38' 10''$ E., on the Agra road, nearly 2 miles from Shikohábád station on the East Indian Railway, and 34 miles west of Mánipuri town. Population (1881) 11,826, namely, males 6347, and females 5479. Hindus number 6741; Muhammadans, 4957; Jains, 122; and Christians, 6. The old town, a large straggling collection of houses, lies east and south of the main road; but the principal *bázár* lines the highway itself, and contains 9 *sardís* (native inns) for the accommodation of travellers. An ancient mound, once the site of the fort, is now covered by houses. The town contains numerous temples and mosques, and is the birthplace of several Hindu and Musalman saints. Handsome *tahsili*, police station, post office, school; telegraph office at

railway station. Named after Prince Dára Shikoh, traces of whose residence, garden, and wells still remain. The British obtained possession of Shikohábád in 1801, and established a cantonment south of the town. In 1802, a Maráthá force under Fleury surprised the British detachment; after which the cantonment was removed to Máinpuri. Formerly a great emporium for raw cotton, but the trade has declined. Manufacture of sweetmeats and cotton cloth. A small house-tax is levied for police and conservancy purposes.

Shillong.—Chief town of the Khási and Jaintia Hills District, and administrative head-quarters of the Chief Commissioner of Assam; situated in lat. $25^{\circ} 32' 39''$ N., and long. $91^{\circ} 55' 32''$ E., on a table-land 4900 feet above sea-level, and 64 miles south by road from Gauháti (Gowhatty). Shillong first became the civil station of the Khási and Jaintia Hills in 1864, in substitution for Cherra Poonjee. In 1874, on the constitution of the Chief Commissionership of Assam, it was chosen as the head-quarters of the new administration, on account of its salubrity and its convenient position between the Brahmaputra and Surmá valleys.

The Chief Commissioner permanently resides at Shillong, and also the heads of all the departments of Government. A considerable native population is already settled, which increases from year to year. Population (1872) 1363; (1881) 3640. Municipal taxation (1883-84), £374, or an average of 3s. 6d. per head of the population (2137) within municipal limits. Large sums of money have been expended on the erection of public buildings. A printing press has been established, from which issue all the official documents and reports of the Province. A church has been built, at which a chaplain officiates alternately with Gauháti. The nominal area of the station is 7 miles in length by $1\frac{1}{2}$ mile broad. An excellent water-supply has been introduced through an aqueduct, which has its source in the neighbouring hill streams; the water is distributed by means of pipes to every house in the civil station, and by hydrants in the public *bázárs* and other convenient places. Sanitary measures are stringently enforced. The cart-road from Gauháti, the old capital of Assam on the Brahmaputra, was opened for traffic in 1877. The entire distance of 64 miles is now accomplished by *tonga dák* in a single day; and the sanatorium is thus rendered easily accessible from the fever-stricken plains of the Brahmaputra valley. The gradients on this road are a model of engineering skill. In 1885, the cantonments at Shillong were occupied by the 42nd Regiment of Bengal Infantry, with 2 mountain guns. A large weekly market is held in the *bázár*. A model farm established in the neighbourhood in 1873 did not prove successful, either from a financial or an agricultural point of view, and has been abolished. (See *The Statistical Account of Assam*, vol. ii. p. 229)

The climate of Shillong is singularly mild and equable. A temperature higher than 80° F. is seldom recorded. Hoar-frost lies upon the ground almost every morning during the months of December, January, and February. Shallow water occasionally freezes over, but snow never falls. Fires are necessary from November to March or April, the fuel used being coal, obtained at great cost from the beds at Máo-beh-lyrkar. The price fluctuates much, depending on the cost of carriage; it has been known to reach as high as £3 per ton. The rainfall registered during the fifteen years ending in 1881 averaged 87·44 inches a year. The prevailing diseases are dysentery, bowel complaints, and disorders of the liver; but when once European residents have passed through a short period of acclimatizing indisposition, they generally enjoy excellent health.

Shillong.—Mountain range in the Khási and Jaintia Hills District, Assam, overlooking the station of the same name. The highest peak (lat. 25° 34' 18" N., long. 91° 55' 43" E.) attains a height of 6450 feet above the sea, being the most elevated point in the District. The crown of the ridge is covered with a sacred grove of large timber-trees. This peak is the site to which the name Shillong properly belongs; the neighbouring station is known to the natives as Lábán, from a village of that name which adjoins it.

Shimoga.—District forming the north-western portion of the Nagar Division of Mysore, lying between 13° 30' and 14° 38' N. lat., and between 74° 44' and 76° 5' E. long. Area, 3797 square miles; population, according to the Census of 1881, 499,728 souls. Bounded along the north and west by the Districts of Dhárwár and North Kánara, in the Bombay Presidency. The administrative head-quarters are at SHIMOGA TOWN, on the left bank of the Tunga river, just above its junction with the Bhadra.

Physical Aspects.—The District constitutes part of the principal watershed of Southern India. The river system is twofold—the rivers in the east, the Tunga, the Bhadra, and the Varada uniting to form the Tunga-bhadra, which ultimately falls into the Kistna, and so into the Bay of Bengal; while in the west, a few minor streams break through the barrier of the Western Gháts and reach the Kánara coast. The whole region is covered with hills and valleys, but it naturally divides into two distinct portions. The larger half, towards the west, known as the Malnáid or hill country, gradually rises towards the Western Ghats, where isolated peaks attain a height of more than 4000 feet above sea-level. The general elevation of the District is about 2100 feet; and towards the east it opens out into the Maidan or plain country, which forms part of the general plateau of Mysore. The Malnáid presents a wealth of picturesque scenery and wild life. A park of giant timber-trees, overgrown with brilliant creepers, extends continuously for miles,

only interrupted by glades of verdant grass; the towering mountains form a precipitous background; and wild animals of all kinds abound.

Near the north-western frontier of the District, the Sharavati river bursts through the Western Ghats by the celebrated Falls of Gersoppa, which surpass any other waterfall in India, and, in the combined attributes of height, volume of water, and picturesque situation, have few rivals in the world. The river here is 250 yards wide, and throws itself over a chasm 960 feet in depth in four distinct falls, one of which has an unbroken descent of 830 feet.

The mineral products include iron-ore, and laterite for building. Magnetic stones, occasionally found on the summits of the Ghats, are highly prized. In the valleys of the Malnad, the soil is a loose, sandy loam, very suitable for rice; in the north-east appears the black cotton-soil. The wealth of timber in the Malnad remains as yet unproductive, owing to the inaccessible nature of the country. The more valuable trees include *pin* (*Colophyllum tomentosum*), wild jack, ebony, *sam* (*Prosopis spicigera*), the large *devadāram* (*Erythroxylon monogynum*), gamboge, and a species of cedar. In the centre of the District are found teak, sandal-wood, the areca, cocoa-nut, and sago palms, bamboo, cardamoms, and the pepper vine. Farther to the east, large trees altogether disappear. An area of about 35 square miles has been reserved by the Forest Department, including a teak plantation; and trees in avenues are planted along the public roads. Among wild animals, bison are especially numerous in the *tiluk* of Sagar, where wild elephants are also occasionally seen. Tigers, leopards, bears, wild hog, *simbar* and *chital* deer, and jungle sheep are common in the wooded tracts.

History.—The present area of Shimoga District has supplied more than one important city to Southern India. The oldest memorials are three copper plates, purporting to be land-grants of Janamejaya, the monarch to whom the *Mahābhārata* was recited. Considerable doubt has been thrown upon the genuineness of these inscriptions; and the dates to which they have been referred belong to legend rather than to history. Janamejaya is assigned to 1300 B.C. One of the plates bears the date 89 of the Yudishthira era, which would be equivalent to 3012 B.C., according to Mr. Lewis Rice.

Local history commences with the Kadambas, whose capital was at Banavasi, on the north-western frontier of this District, and whose dominions extended over great part of Kānara and Mysore. Banavasi is identified as one of the spots visited by a Buddhist missionary in 245 B.C., and as mentioned by the Greek geographer Ptolemy in the 2nd century A.D. In the 6th century, the Kadambas were overthrown by the Chalukya kings, under whom they long continued to govern as feudatories; and at about the same time a petty Jain kingdom was established at Huncha. The Chalukyas were in their turn expelled by the

Kalachuryas, under whose protection the Lingáyat religion became predominant in Kánara.

Shimoga District subsequently was included within the dominions of the Hoysala Ballálas and the kings of Vijayanagar, who were successively suzerains over all Southern India. At the time of the decadence of the latter empire, many local chiefs or *pálegárs* succeeded in asserting their independence, among whom the Keladi and the Basvapatna families divided between them the area of this District. The Keladi family, who were Lingáyats, first established themselves at Ikkeri about 1560, and subsequently transferred their residence to Bednúr, better known by the honorific appellation of Nagar. At one time they attained great power; but they were finally conquered by Haidar Ali in 1763, when their territory was annexed to Mysore. The Basvapatna chiefs were a less influential family, whose capital was at Tankere, in the adjoining District at Kádúr. They also fell before the organized empire of Haidar Ali in 1761.

After the death of Tipú, and the re-establishment of the old Hindu dynasty of Mysore in 1799, Shimoga District repeatedly became the scene of disturbances, caused by the mal-administration of the Deshastá Bráhmans, who had seized on the offices of government, and made themselves obnoxious to both the Lingáyats and the cultivators. These disturbances culminated in the rebellion of 1830, led by representatives of the old Keladi and Basvapatna families, which occasioned the direct assumption of the administration of the entire State by the British.

Population.—In 1838, a Report by Mr. Stokes estimated the population of the District to be 304,120 souls, and a *khána sumári* or house enumeration, in 1853-54, returned a total of 427,179. The regular Census of 1871 ascertained the number to be 498,976, showing an increase of 64 per cent. in the interval of thirty-three years, and nearly 17 per cent. in the later period of eighteen years, if the earlier estimates can be trusted. The last Census of 1881 returned the population at 499,728, namely, males 259,296, females 240,432; density of population, 132 persons per square mile; villages per square mile, 0.52; houses per square mile, 2.79; persons per house, 5.85. The District contained 1973 towns and villages, consisting of 85,365 occupied and 9185 unoccupied houses. Classified according to sex and age, there were—under 15 years of age, boys 94,781, and girls 93,123; total children, 187,904, or 37.6 per cent. of the District population. The adults numbered, males 164,515, and females 147,309, total, 311,824, or 62.4 per cent.

The religious division of the people shows—Hindus, 470,678, or 94.2 per cent.; Muhammadans, 27,574, or 5.5 per cent.; and Christians, 1476. The Bráhmans number 25,584, of whom the great majority belong to the Smarta sect; those claiming the rank of Kshatriyas are

returned at 14,694, including 13,429 Maráthás and 1265 Rájputs; the Vaisyas are poorly represented by only 1106 persons, all Komatis. Of inferior castes, the most numerous are Wokligas (68,219), who are agricultural labourers; Idigas (58,252), whose caste occupation is that of toddy-drawers; and Vaddárs (13,467), of whom many are also cultivators. The Lingáyats, who have always been influential in this part of the country, number 51,504; agricultural castes, 26,861; Kunchigars (brass and coppersmiths), 11,186; Kurubás (shepherds), 21,792; Uppárs (salt-makers), 8815; Tíglárs (market gardeners), 236; Gollárs (cowherds), 3009; Bedárs (hunters), 21,010; Bestárs (fishermen), 13,331; Banajigárs (traders), 3282; Neyígás (weavers), 21,866; Kumbhárs (potters), 3604; Agasás (washermen), 11,864; Darjis (tailors), 888; Nápits (barbers), 2777; Ganígárs (oil-pressers), 825; Myadárs, 3046. Out-castes are returned at 61,472; wandering tribes, 10,726.

The Musalmáns, who muster strongest in the *táluk* of Shimoga, are mostly all described as Deccani Musalmáns of the Sunni sect. Shiás number 388; Wahábts, 5; Daira or Mahadávi, 45; and 'others,' 604. Out of the total of 1476 Christians, 34 were Europeans and 51 Eurasians (chiefly residing on the coffee plantations), leaving 1391 for the native converts. According to another principle of classification, 100 are Protestants and 1376 Roman Catholics.

With reference to occupation, the Census distributed the male population into the following six main groups:—(1) Professional, civil, and military class, 8433; (2) domestic servants, inn and lodging keepers, 1535; (3) commercial class, including bankers, merchants, and carriers, 6523; (4) agricultural and pastoral class, including gardeners, 131,477; (5) industrial class, including all manufacturers and artisans, 10,693; and (6) indefinite and non-productive class, comprising general labourers, male children, and persons of unspecified occupation, 100,635.

The District contains 1973 populated towns and villages, with a few houses of the better class, or over £50 in value. Of the total number of towns and villages, 1099 contain less than two hundred inhabitants; 626 from two to five hundred; 203 from five hundred to one thousand; 34 from one to two thousand; 7 from two to three thousand; 1 from three to five thousand; and 1 from ten to fifteen thousand. The only place in the District with more than 5000 inhabitants is SHIMOGA Town, the head-quarters of the District, on the Tunga river; population (1881) 12,040. Its prosperity dates from the introduction of British rule. There are many sites of ruined cities in the District, which have been already alluded to. The chief are—Nagar or Bednúr, Ikkeri, and Keladi, all associated with a family of Lingayat *padlegárs*; Basvapatna, the early residence of the Tarikere chiefs; the Jain ruins of Humcha;

and Banavasi, with its Buddhist memorials. The most important modern towns, after Shimoga itself, are Chennagiri and Sagar. There are altogether ten municipalities in the District, with an aggregate municipal income, in 1881-82, of £2249.

Agriculture.—The staple food crop of the District is rice, which is especially cultivated in the terraced valleys of the Malnad or hill country. The names of 60 different varieties are enumerated. The crop is sown from April to July, and reaped from November to February. In some tracts, the cultivation of 'dry crops' predominates. Of these, *ragi* (Eleusine corocana) is preferred by the natives for their own food, while rice is largely exported. Next to rice, the most important crop is sugar-cane, which is largely grown in the *táluk* of Shikárpur. The canes are planted from January to June, and gathered after a full twelve months. The juice is for the most part converted into jaggery. The tract about Nagar produces the finest areca-nuts in Mysore. Miscellaneous crops include oil-seeds, a great variety of vegetables and fruits, pepper, and cardamoms. The coffee zone of the District is estimated to extend over 1000 square miles, but a considerable portion of this area is not of the most favourable character. There are altogether 250 plantations, of which 6 are owned by Europeans. In 1861, an unsuccessful attempt was made to improve the indigenous production of cotton, by the distribution of American seed.

The following agricultural statistics are merely approximate:—Out of the total area of 3797 square miles, only 1110 were returned in 1880-81 as under cultivation, and 433 as cultivable. The area under rice is 209,217 acres, with an out-turn valued at more than £335,000; other food-grains, 303,908 acres; cotton, 921; cocoa-nut and areca-nut, 16,942; coffee, 4846; sugar-cane, 7245; oil-seeds, 6000; fibres, 1600; tobacco, 500; vegetables, 762; pepper, 532 acres: total area under actual cultivation, 552,473 acres. Average rent per acre for rice land, 9s.; wheat land, 6s.; land producing inferior grains, 9d., cotton, 3s.; oil-seeds, 3s. 3d.; fibres, 3s. 6d.; sugar-cane, 4s.; and tobacco, 5s. Average produce of rice land per acre, 671 lbs.; wheat, 40 lbs.; inferior food-grains, 671 lbs.; cotton, 29 lbs.; oil-seeds, 170 lbs., fibres, 500 lbs.; sugar, 360 lbs.; tobacco, 240 lbs., and coffee, 34 lbs. Current prices per *maund* of 80 lbs.—rice, 4s. 1½d.; wheat, 4s. 9d.; cotton, £1, 17s. 7½d.; salt, 8s. 11½d.; gram, from 3s. 2½d. to 4s. 9½d., *ragi*, 1s. 5½d.; *dál*, 5s. 10½d.; tobacco, £3, 7s. 6d.; unrefined sugar, 8s.; *ghi*, the Indian substitute for butter, lard, etc., £2, 9s. 2½d. A plough bullock costs from £2 to £20; sheep, from 4s. to £1. Iron sells at 12s. per 80 lbs. Skilled labour costs 1s. 3d. to 2s.; unskilled labour from 6d. to 1s. The hire of a cart per day is 1s. 6d. to 2s.; of a donkey, 7½d. to 1s.; of a boat, 1s. to 2s.

Irrigation is carried on both from tanks and from channels artificially

drawn from the rivers by means of anicuts or weirs. The total number of tanks is 8313, including the great reservoir of Sulekere, in the *táluk* of Chennagiri, which is 40 miles in circumference, and ranks as the second largest in Southern India. In this same neighbourhood are to be found the best cattle in the District; and there are several grazing-grounds for the *amrita mahál*, or royal breed maintained by the State. Buffaloes are largely used for agricultural purposes, and pack-bullocks are bred to carry the through traffic across the Gháts. The returns of 1880-81 showed a total of 401,153 cows and bullocks, and 47,643 sheep and goats; horses, 316; ponies, 2091; donkeys, 2317; and pigs, 2678.

Manufactures, etc.—The chief industries in the District are the weaving of coarse cotton-cloth and rough country blankets or *kambli*s, and the making of iron implements, brass-ware, pottery, and jaggery from the sugar-cane. Oil is expressed from a great variety of vegetable products. At certain localities are special manufactures of striped carpets, chintz, coarse brown paper, stone jugs, and rope from various fibres. The carving of sandal-wood constitutes a speciality of the *gúdi-gárs* of Soráb, whose delicate and elaborate workmanship is considered superior to that of either Bombay or Canton. The chief articles turned out are caskets and cabinets, ornamented either with leaves and figures from the Hindu pantheon, or with a copy of any design that may be ordered. Carving of inferior merit is also produced in other villages. The manufacturing stock of the District is returned at 1205 looms, and 63 oil-mills.

The trade of Shimoga is conducted with both the east and west coasts, and also with Bangalore. The chief exports are rice and other food-grains, jaggery from the sugar-cane, areca-nuts, coffee, pepper, and iron articles. The imports received in exchange are European piece-goods, copper vessels, oils of various kinds, tobacco, betel-leaf, and gold and silver ornaments. There are four passes across the Western Gháts, of which the two most important leave the District near the Falls of Gersoppa and at the town of Agumbi. The local trade is mostly in the hands of the Lingáyats, whose centres of operation are at Ságar, Tirthahalli, and Nyampti. There are five weekly fairs, each attended by more than 1000 people; and several annual religious festivals, at which much buying and selling is done. There is no railway in the District. The returns furnished for the first edition of this work showed an aggregate length of State roads of 225 miles, maintained at an annual cost of £3425; District roads, 171 miles, costing £971.

Administration.—In 1881-82, the total revenue of Shimoga District, excluding education and public works, amounted to £190,941. The chief items were, land revenue, £120,467; *shyar* or customs, £27,870;

forests, £955. The District is now divided into 9 *taluks* or fiscal divisions, with 50 *hoblis* or minor fiscal units. In 1881-82, the total number of estates on the register was 96,557. The District in 1883 contained 3 civil and 6 criminal courts. During the year 1881, the average daily prison population of the District jail was 343·82; and of the *taluk* lock-ups, 81·85: total, 425 67, of whom 18 78 were women, showing 1 person in jail to every 1173 of the population. In the same year, the District police force numbered 18 officers and 458 men; and the municipal police, 1 officer and 34 men: total, 511 men of all ranks, maintained at a cost of £4912. These figures show 1 policeman to every 8 square miles of area or to every 978 of the population; the cost being £1, 5s. per square mile and 2d. per head of population.

The number of schools aided and inspected by Government in 1881 was 114, attended by 4462 pupils, being 1 school to every 33 square miles, and 9 pupils to every 1000 of the population. Of the schools, three were for girls, attended by 168 pupils. Besides these schools, there was a jail school attended by 148 scholars; and a college. The Census of 1881 returned 8674 boys and 327 girls as under instruction, together with 19,888 males and 274 females able to read and write. The returns furnished for the first edition of this work showed, in addition to the aided and inspected schools, 80 indigenous schools, with 1009 pupils.

Medical Aspects.—Shimoga District offers great varieties of climate. The Ghâts on the western frontier are in some places only 8 miles distant from the sea; and here the south-west monsoon strikes with its full force, bringing a rainfall of more than 150 inches in the year. But the District stretches from the Ghâts for about 100 miles towards the central table-land of Southern India; and the rainfall gradually diminishes, until it only amounts to about 25 inches at Chennaginri, most of which falls in October during the north-east monsoon. The sea-breeze from the west is distinctly felt as far as Shimoga town. During the two years 1873 and 1874, the maximum temperature registered was 92° F in the month of April, and the minimum 75° F. in December. In 1881, the maximum in April was 99° F.; the minimum in January, 70° F. The average rainfall at Shimoga town, calculated over a period of forty-four years ending 1881, was 29·26 inches, but as much as 170 inches has been known to fall within the year at Nagar.

Malarious fever of a persistent type prevails in the Malnad or hill country; and the natives appear to be even more exposed to its attacks than Europeans, when once the latter have become acclimatized. The vital statistics are far from trustworthy; but it may be mentioned that, out of the total of 10,843 deaths reported in 1881-82, 6061 were assigned to fevers, 1083 to bowel complaints, 204 to small-pox, 21 to snake-

bite or wild beasts, and 21 to suicide, 6 to woundings, 54 to accidents, and 3407 to other causes. In 1874, the dispensary at Shimoga town was attended by 302 in-patients, and by 9963 out-patients. [For further information regarding Shimoga District, see the *Mysore and Coorg Gazetteer*, by Mr. Lewis Rice, vol. ii. pp. 339-400 (Bangalore, 1876); and also the *Census Report of Mysore* for 1881.]

Shimoga.—*Táluk* in Shimoga District, Mysore State. Area, 547 square miles, of which 203 are cultivated. Population (1881) 81,919, namely, males 40,876, and females 41,043. Hindus number 71,651; Muhammadans, 9327; and Christians, 941. Land revenue (1881-82), exclusive of water rates, £11,614. The west and south is hilly and overgrown with jungle, which gives shelter to many wild beasts. In 1883 the *táluk* contained 1 civil and 2 criminal courts; police circles (*thánds*), 7; regular police, 83 men; village watch (*chaukidárs*), 311. Gross revenue, £18,154.

Shimoga (*Shiva-mukha*, 'face of Siva,' or *Shi-moge*, 'sweet-pot')—Chief town of Shimoga District, and head-quarters of Shimoga *táluk*, Mysore State; situated in lat. 13° 55' 30" N., and long. 75° 36' 5" E., on the right bank of the Tunga river, 171 miles by road north-west from Bangalore. Population (1881) 12,040, namely, males 5947, and females 6093. Hindus number 8152; Muhammadans, 3131; and Christians, 757. Municipal revenue (1880-81), £2886. The early history of the town is unknown. In 1791, a battle was fought in the neighbourhood, in which the Maráthás defeated a general of Tipú Sultán, and sacked the town. Its growth in wealth and prosperity dates from the time when it was made the head-quarters of the District. A weekly fair, held on Tuesdays, is attended by 1500 persons.

Shimshupa (or *Shimsha*).—River in Tunkúr District, Mysore State.—*See SHAMSHA.*

Shin-da-we.—A highly venerated pagoda in Tavoy District, Tenasserim Division, Lower Burma. It is 77 feet high, and 301 feet in circumference at the base. The shrine is supposed to enclose a relic of Gautama, which, released by its possessor, the miraculously-born Thun-gan-Min, alighted at the spot where the pagoda now stands, and was received by the people in a golden basket.

Shingnapur.—Municipal town in Mán Sub-division, Sátára District, Bombay Presidency; situated in lat. 17° 51' 20" N., and long. 74° 42' 6" E., 46 miles east by north of Sátára town, and 13 north-east of Dahivadi, the Sub divisional head-quarters. Population (1881) 1167. Shingnapur is a famous place of pilgrimage, situated in a nook of the Shikhar Shingnapur hills. The hill, crowned with a temple of Mahádeo, to which the village owes its celebrity, appears like the point of a very obtuse-angled cone. The great fair is held in March-April. The attendance sometimes reaches 50,000. Great pains are taken as to the

sanitary arrangements during the fair. Government provides a hospital assistant at the expense of the municipality. Care is taken to prevent the water from pollution. The transactions are valued at £5000. The Bhawāni Ghāt road which connects this town with NATE-PUTE, a trade centre in Sholápur District, is under construction. Municipal income (1883-84), £614; incidence of taxation, rs. 4½d. per head of population.

Shin-maw.—Pagoda on Tavoy Point, Tenasserim Division, Lower Burma. Founded in 1204 A.D. by Nara-pad-di-si-thu, king of Burma, when he visited this part of his dominions. It is highly revered as containing a tooth of Gautama.

Shin-mut-ti.—The most famous pagoda in Tavoy District, Tenasserim Division, Lower Burma, 58 feet high and 308 feet in circumference at the base. It is said to have been built to enshrine an image which was miraculously floated from India to the spot where the sacred edifice now stands. A sacred stone and a banian tree are shown near the pagoda. An annual festival is held here.

Shirálí.—Port on the south-western coast of North Kánara District, Bombay Presidency. Situated at the mouth of the Venktapur river, about 20 miles south of Honawár, and 4 miles north of Bhatkal. There was formerly a trade in salt which was manufactured here, but this has been abolished. Average annual value of trade for four years ending 1881-82—imports, £1095; exports, £1881. Custom-house and school.

Shiroda (or *Chiroda*).—Petty State in the Gohelwár *prant* or division of Káthiawár, Bombay Presidency; consisting of 1 village, with 1 shareholder or tribute-payer. Area, 72 square miles. Population (1881) 241. Estimated revenue, £90; of which £12, os. 6d. is paid as tribute to the Gáekwár of Baroda, and £1, 4s to the Nawáb of Junágarh.

Shirol.—Town in Kolhápur State, Bombay Presidency. Lat. 16° 44' 10" N., long. 74° 38' 40" E. Population (1881) 6944. Hindus number 6251; Muhammadans, 384; and Jains, 309.

Shiron.—Town in Baroda State, Bombay Presidency. Population (1881) 6047. Delightfully situated on the Nabadá, with a noble flight of 100 stone steps from the houses to the water-side.

Shirpur.—Sub-division of Khándesh District, Bombay Presidency. Area, 651 square miles. Population (1872) 34,642; (1881) 43,321, namely, males 22,356, and females 20,965; occupying 6765 houses, in 1 town and 98 villages. Hindus number 34,817; Muhammadans, 2859; and 'others,' 5645. A broken range of the Sátpurás, running from east to west, divides this Sub-division into two parts, each with distinct natural features. The northern part comprises a wild and hilly country sparsely peopled by Rhils. The southern is an unbroken plain,

bite or wild beasts, and 21 to suicide, 6 to woundings, 54 to accidents, and 3407 to other causes. In 1874, the dispensary at Shimoga town was attended by 302 in-patients, and by 9963 out-patients. [For further information regarding Shimoga District, see the *Mysore and Coorg Gazetteer*, by Mr. Lewis Rice, vol. ii. pp. 339-400 (Bangalore, 1876); and also the *Census Report of Mysore* for 1881.]

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Shimoga (*Shiva-mukha*, 'face of Siva,' or *Sht-moge*, 'sweet-pot').—Chief town of Shimoga District, and head-quarters of Shimoga *táluk*, Mysore State; situated in lat. 13° 55' 30" N., and long. 75° 36' 5" E., on the right bank of the Tunga river, 171 miles by road north-west from Bangalore. Population (1881) 12,040, namely, males 5947, and females 6093. Hindus number 8152; Muhammadans, 3131; and Christians, 757. Municipal revenue (1880-81), £2886. The early history of the town is unknown. In 1791, a battle was fought in the neighbourhood, in which the Maráthás defeated a general of Tipú Sultán, and sacked the town. Its growth in wealth and prosperity dates from the time when it was made the head-quarters of the District. A weekly fair, held on Tuesdays, is attended by 1500 persons.

Shimshupa (or *Shimsha*).—River in Túngkúr District, Mysore State.—*See SHAMSHA.*

Shin-da-we.—A highly venerated pagoda in Tavoy District, Tenasserim Division, Lower Burma. It is 77 feet high, and 301 feet in circumference at the base. The shrine is supposed to enclose a relic of Gautama, which, released by its possessor, the miraculously-born 'Thin-gan-Min, alighted at the spot where the pagoda now stands, and was received by the people in a golden basket.

Shingnapur.—Municipal town in Mán Sub-division, Sátára District, Bombay Presidency; situated in lat. 17° 51' 20" N., and long. 74° 42' 6" E., 46 miles east by north of Sátára town, and 13 north-east of Dahivadi, the Sub-divisional head-quarters. Population (1881) 1167. Shingnapur is a famous place of pilgrimage, situated in a nook of the Shikhar Shingnapur hills. The hill, crowned with a temple of Mahádeo, to which the village owes its celebrity, appears like the point of a very obtuse-angled cone. The great fair is held in March-April. The attendance sometimes reaches 50,000. Great pains are taken as to the

sanitary arrangements during the fair. Government provides a hospital assistant at the expense of the municipality. Care is taken to prevent the water from pollution. The transactions are valued at £5000. The Bhawáni Ghát road which connects this town with NATE-PUTE, a trade centre in Sholápur District, is under construction. Municipal income (1883-84), £614; incidence of taxation, 1s. 4½d. per head of population.

Shin-maw.—Pagoda on Tavoy Point, Tenasserim Division, Lower Burma. Founded in 1204 A.D. by Nara-pad-di-si-thu, king of Burma, when he visited this part of his dominions. It is highly revered as containing a tooth of Gautama.

Shin-mut-ti.—The most famous pagoda in Tavoy District, Tenasserim Division, Lower Burma, 58 feet high and 308 feet in circumference at the base. It is said to have been built to enshrine an image which was miraculously floated from India to the spot where the sacred edifice now stands. A sacred stone and a banian tree are shown near the pagoda. An annual festival is held here.

Shirálí.—Port on the south-western coast of North Kánara District, Bombay Presidency. Situated at the mouth of the Venktapur river, about 20 miles south of Honawár, and 4 miles north of Bhatkal. There was formerly a trade in salt which was manufactured here, but this has been abolished. Average annual value of trade for four years ending 1881-82—imports, £1095; exports, £1881. Custom-house and school.

Shiroda (or *Chiroda*).—Petty State in the Gohelwár *prant* or division of Káthiáwár, Bombay Presidency; consisting of 1 village, with 1 shareholder or tribute-payer. Area, 72 square miles. Population (1881) 241. Estimated revenue, £90; of which £12, os. 6d. is paid as tribute to the Gáekwár of Baroda, and £1, 4s to the Nawáb of Junágarh.

Shirol.—Town in Kolhápur State, Bombay Presidency. Lat. 16° 44' 10" N., long. 74° 38' 40" E. Population (1881) 6944. Hindus number 6251; Muhammadans, 384; and Jains, 309.

Shiron.—Town in Baroda State, Bombay Presidency. Population (1881) 6047. Delightfully situated on the Narbaddá, with a noble flight of 100 stone steps from the houses to the water-side.

Shirpur.—Sub-division of Khándesh District, Bombay Presidency. Area, 651 square miles. Population (1872) 34,642; (1881) 43,321, namely, males 22,356, and females 20,965; occupying 6765 houses, in 1 town and 98 villages. Hindus number 34,817; Muhammadans, 2859; and 'others,' 5645. A broken range of the Sátpurís, running from east to west, divides this Sub-division into two parts, each with distinct natural features. The northern part comprises a wild and hilly country sparsely peopled by Bhils. The southern is an unbroken plain,

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with no trees except near village sites. The population is dense near the banks of the Tápti, but becomes scanty as the hills are approached. Although the Sub-division has three rivers that run throughout the year—the Tápti, forming the southern boundary for 26 miles, and its tributaries the Anar and the Arunávati, and numerous other streams from the Sâtpurâs—the supply of surface water is on the whole scanty. The prevailing black soil is a rich loam resting on a yellowish subsoil. In 1865-66, the year of settlement, 3500 holdings (*khdâs*) were recorded, with an average area of 20·9 acres, and an average rental of £3, 1s. 10½d. In 1878-79, the area under actual cultivation was 87,635 acres. Cereals and millets occupied 58,193 acres; pulses, 3386 acres; oil-seeds, 9539 acres; fibres, 15,583 acres; and miscellaneous crops, 934 acres. In 1883 the Sub-division contained 1 civil and 2 criminal courts; police circle (*thând*), 1; regular police, 42 men; village watch (*chankidârs*), 132. Land revenue, £14,327.

Shirpur Sub-division was in 1370 granted in *jâgîr* by Firoz Tughlak, the Emperor of Delhi, to Malik Râjâ, founder of the Khândesh kingdom. In 1785 it became part of Holkâr's possessions. In 1818 it was ceded to the British.

Shirpur.—Town in Khândesh District, Bombay Presidency, and head-quarters of Shirpur Sub-division. Situated 30 miles north of Dhulia, in lat. 21° 21' N., and long. 74° 57' E. Population (1881) 7613, namely, Hindus, 6116; Muhammadans, 1024; Jains, 247; and 'others,' 226. Shirpur suffered severely in the floods of 1875, when water stood in places six feet deep, destroying property to the value of £3200. Municipal income (1883-84), £373; incidence of taxation, 9½d. per head of population. Sub-judge's court, post-office, school, dispensary, rest-house.

Shiurâjpur.—*Tahsil* in Cawnpur District, North-Western Provinces, conterminous with Shiurâjpur *pargand*, lying along the south-west bank of the Ganges, and traversed by several distributaries of the Ganges Canal. Of the total cultivated area, 23 per cent. is watered from these channels, and a good deal of *dîmat* soil in the south of the *tahsil* has been improved by the substitution of canal for *jâlîl* or marsh irrigation. Notwithstanding the abundance of canal water, wells are extensively used. Excepting in the tract along the cliff of the Ganges, where, owing to the elevation of the surface, water lies at a great depth, the sub strata are so sandy and treacherous as to render well-digging a perilous venture; while the unevenness of the ground prevents the spread of canal irrigation in this direction. The East Indian Railway passes through the southern corner of the *tahsil*, with a station at Bhânpur. Shiurâjpur is connected with Cawnpur by the Grand Trunk Road, and the *tahsil* is well provided with roads.

Area, 261 square miles, of which 132 square miles are cultivated.

The chief autumn crops consist of cotton, *jodr*, and indigo, and the spring crops of wheat and *bdjra*. Poppy, tobacco, and *pin* are largely grown. Population (1881) 150,728, namely, males 79,485, and females 71,243. Average density of population, 570·9 persons per square mile. Classified according to religion, Hindus number 144,621, and Muhammadans 6107. Of the 320 towns and villages in the *tahsil*, 225 contain less than five hundred inhabitants; 61 between five hundred and a thousand; and 34 between one and five thousand. Land revenue, £27,409; total Government revenue, including rates and cesses, £30,698. Rental paid by cultivators, £49,868. In 1885, Shiurájpur *tahsil* contained 2 criminal courts, and 2 police stations (*thánds*); strength of regular police, 31 men; village watch or rural police (*chaukidárs*), 271.

Shiurájpur.—Town in Cawnpur District, North-Western Provinces, and head-quarters of Shiurájpur *tahsil*; situated on the Grand Trunk Road, 21 miles north-west of Cawnpur city. Population (1872), including the neighbouring villages of Rájpur and Barrájpur, 7883. Not returned separately in the Census of 1881. Besides the Sub-divisional courts and offices, the town contains a police station, post-office, and Government school. A fort, formerly the seat of a Chandela Rájá, was razed to the ground after the chief's rebellion in 1857–58.

Shiurájpur.—Small village and station on the East Indian Railway in Bara *tahsil*, Allahábád District, North-Western Provinces. Population (1881) 477. Noted for its stone quarries. Rising market, post-office; police station.

Shiurájpur.—Village in Káhnpur *tahsil*, Fatehpur District, North-Western Provinces; situated in lat. 26° 10' 20" N, and long 80° 38' 30" E, on the Ganges, 22 miles from Fatehpur town. Population (1881) 1425, chiefly Bráhmans. The village is the site of the largest fair in the District, which is held on the occasion of the *Purnamásti* festival in October–November.

Shivagangá.—*Zamindári* and town in Madura District, Madras Presidency.—*See* SIVAGANGA.

Shivagangá.—Hill in Bangalore District, Mysore.—*See* SIVAGANGA.

Shivbara.—Petty Bhil State in Khándesh District, Bombay Presidency.—*See* DANG STATES.

Shivgaon.—Sub-division of Ahmadnagar District, Bombay Presidency. Area, 670 square miles. Population (1881) 87,113, namely, males 44,093, and females 43,020; occupying 16,100 houses, in 1 town and 179 villages. Hindus number 79,208, Muhammadans, 5776; and 'others,' 2129. Shivgaon is the most easterly Sub-division of the District. With one or two exceptions, the streams which drain the tract all rise in the hills on the south and south-east, and flow northward into the Godavari. The villages are for the most part

well supplied with water, which throughout the low grounds is always to be found at a moderate depth. Near the Godávri, the soil is deep and stiff, but near the hills it is of a lighter composition, and more easily worked. Early and late crops are grown in about equal proportions. In 1881-82, the actual area under cultivation was 222,759 acres. Cereal and millets occupied 177,102 acres; pulses, 17,612 acres; fibres, 19,531 acres; oil-seeds, 7001 acres; and miscellaneous crops, 1513 acres. About 3000 looms are worked in the Sub-division, of which about 2000 are in the town of Páthardi, and 200 in Tisgón. The principal manufacture is of various kinds of cotton cloth, mostly coarse. In 1883 the Sub-division contained 2 civil and 2 criminal courts; police circle (*tháná*), 1; regular police, 34 men; village watch (*chaukidárs*), 272. Land revenue, £19,914.

Shivgáon.—Town in Ahmadnagar District, Bombay Presidency, and head-quarters of Shivgáon Sub-division; situated 40 miles north-east of Ahmadnagar city, in lat. $19^{\circ} 21' N.$, and long. $75^{\circ} 18' E.$ Population (1881) 2948. Shivgáon is a ruined town on a wide plain; joined with Paithan and Ahmadnagar by a good road. It is surrounded by a wall. Sub-divisional offices, post-office, dispensary, school, temples, and weekly market on Sundays.

Shivner.—Hill fort of the town of Junnar, in Poona (Púna) District, Bombay Presidency; situated not far from Harischandragarh, and about 50 miles north of Poona city. The hill of Shivner rises over a thousand feet, and stretches about a mile across the plain. It is triangular in shape, narrowing from a southern base of about 800 yards to a point of rock in the north. Near the south, the lower slopes of its eastern face are crossed by a belt of rock 40 or 50 feet high. The south-west of the hill is broken, and from about half-way up is strengthened by outworks and bastioned walls. Shivner is interesting as having been the birthplace of Sivaji the Great.

During the first and second, and probably the third century after Christ, the hill seems to have been a great Buddhist centre. About 50 cells and chapels remain. They are found on three sides of the hill, but most of them are cut in its eastern face. Shivner was granted in 1599 to Sivaji's grandfather, Máloji Bhonsla; and here, in 1627, Sivaji was born. It was often taken and retaken; and once, in 1670, the forces of Sivaji himself were beaten back by its Mughal garrison. Besides its five gates and solid fortifications, it is celebrated for its deep springs. They rise in pillared tanks of great depth, supposed by Dr. Gibson to be coeval with the series of Buddhist caves which pierce the lower portion of the scarp. The fort commands the road leading to the Náneghát and Malsejghát, formerly the chief line of communication between this part of the Deccan and the coast. [For further information respecting Shivner fort and caves, see the *Gazetteer of the*

Bombay Presidency, vol. xviii. part iii. pp. 153-163, and pp. 184-201 (Bombay, 1885).]

Shiyali (Siyali).—*Taluk* or Sub-division of Tanjore District, Madras Presidency. Area, 159 square miles. Population (1881) 114,041, namely, 55,465 males and 58,576 females; occupying 19,647 houses, in 1 town and 190 villages. Hindus number 106,621; Muhammadans, 4614; and Christians, 2806. In 1883 the *taluk* contained 1 civil and 2 criminal courts; police circles (*thānds*), 5; regular police, 41 men. Land revenue, £27,883.

Shiyali (Siyali).—Town in Shiyali *taluk*, Tanjore District, Madras Presidency. Lat. $11^{\circ} 14' N.$, and long. $79^{\circ} 48' E.$ Head-quarters of the *taluk*. A station on the South Indian Railway.

Sholágarh.—Town in Munshiganj Sub-division, Dacca District, Bengal. Lat. $23^{\circ} 33' 45'' N.$, long. $90^{\circ} 20' E.$ Population (1881) 6079.

Sholangipuram.—Town in North Arcot District, Madras Presidency.—*See* SHOLINGHAR.

Sholápur.—British District in the Deccan, Bombay Presidency, lying between $17^{\circ} 13'$ and $18^{\circ} 35' N.$ lat., and between $74^{\circ} 39'$ and $76^{\circ} 11' E.$ long. Area, 4521 square miles. Population in 1881, 582,487 souls. Except Bārsi *taluk*, which is surrounded by the Nizām's territory, Sholápur District is bounded on the north by Ahmadnagar District, on the east by the Nizām's Dominions and Akalkot State, on the south by Bijápur District and the Jath and Patwardhan States, and on the west by Sátara, Poona, and Ahmadnagar Districts and the States of Phaltan and Atpádi. On the west, in some places, Patwardhán villages are included, and in others isolated Sholápur villages lie beyond the District limits. The administrative head-quarters are at the city of SHOLAPUR.

Physical Aspects.—Except north of Barsi, west of Mádhā, south-west of Málsiras and Karmála, where there is a good deal of hilly ground, the District is generally flat or undulating. Most of the surface rolls in long low uplands separated by hollows, with an occasional level. The shallow-soiled uplands are suited for pasture, and the deep-soiled lowlands under careful tillage yield the richest crops. The uplands are gently rounded swellings of trap, overgrown with yellow stunted spear-grass. Sholápur District is very bare of vegetation, and presents everywhere a bleak, treeless appearance. The chief rivers are the Bhíma (Bheema) and its tributaries, the Man, the Nira, and the Sina, all flowing towards the south-east. Besides these, there are several minor streams. Of the principal reservoirs, Elrúk and Siddheswar are near Sholapur city, one is at Koregáon, and one at Pandharpur. Wells also to some extent supply water for gardening and drinking purposes. The rainfall being very uncertain, a scarcity of water is

annually felt during the hot weather. Stunted *bábuls* and mangoes, and a few *nims* (*Azadirachta indica*) and *pípals* (*Ficus religiosa*), are the only timber-trees found in the District. As these afford no cover, the District is without wild animals of the larger kinds, except the wild hog and wolf.

History.—Sholápur is one of the Districts which formed the early home of the Maráthás, and the birthplace of the dynasty. It is still a great centre of Maráthá population and mercantile activity. As full an account of the rise and progress of the Maráthá power as is consistent with the scope of this work will be found in the article on INDIA, vol. vi. pp. 317–324, and further local details are given in the notice of the adjacent District of SATARA. An excellent monograph has been written on Poona, Sátára, and Sholápur Districts by W. W. Loch, Esq., of the Bombay Civil Service.

Sholápur, in the early centuries of the Christian era (B.C. 90–A.D. 300?), probably formed part of the territories of the Shatákarni or Andhrabhritya dynasty, whose capital was Paithan on the Godávári, about 150 miles north-west of Sholápur city. Probably also during the 500 years previous to the Muhammadan overthrow of the Deogiri Jádavs in the beginning of the 14th century, Sholápur, like the neighbouring Districts of Bijápur, Ahmadnagar, and Poona, was held by the Early Chalukyas from 550 to 760, by the Ráshtrakutas to 973, by the revived or Western Chalukyas to 1184, and by the Deogiri Jádavs till the Muhammadan conquest of the Deccan about 1300.

The first Muhammadan invasion of the Deccan took place in 1294, but the power of the Deogiri Jádavs was not crushed till 1318. From 1318, Maháráshtra began to be ruled by governors appointed from Delhi, and stationed at Deogiri, which name was changed in 1338 by Muhammad Tughlak to Daulatábád, the ‘Abode of Wealth.’ In 1346 there was widespread disorder, and Delhi officers plundered and wasted the country. These cruelties led to the revolt of the Deccan nobles under the leadership of an Afghán soldier named Hasan Gangu. The nobles were successful, and freed the Deccan from dependence on Northern India. Hasan founded a dynasty, which, in honour of his patron, a Bráhmaṇ, he called Bahmani; and which held sway over the Deccan for nearly 150 years. In 1489, Yusaf Adil Sháh, the Governor of Bijápur, assumed independence, and overran all the country north of Bijápur as far as the Bhíma. For nearly 200 years, Sholapur belonged either to the Bijápur or to the Ahmadnagar kings as the one or the other succeeded in retaining it. In 1668, by the treaty concluded at Agra between Aurangzeb and Alí Adil Sháh of Bijápur, the fort of Sholapur and territory yielding £63,000 of annual revenue was ceded to the Mughals as the price of peace. The general

decay of the Mughal Empire from 1700 to 1750 opened the way for the Maráthá supremacy.

Sholápur formed part of the Peshwá's dominions, until the downfall of his dynasty in 1818, and the incorporation of his territories in the Bombay Presidency. It was at first included with the District of Poona, but was erected into a separate Collectorate in 1838. Since then its progress has been rapid. Roads have been constructed, and the country is now traversed by the Great Indian Peninsula Railway. From time to time its prosperity receives checks owing to drought, to which its situation and the treeless surface of the country expose it. It suffered especially in the famine of 1877, when it was the first District to manifest distress in the Bombay Presidency. Extensive relief works were at once opened, and every possible means were taken to avert the starvation of the people. Much has been done by the opening of canals and ponds, such as the Ekruk and Ashtí tanks, to secure a better water-supply, and to protect the husbandmen from the cruel vicissitudes of the seasons; but the situation and physical characteristics of Sholápur will always render it liable to the calamities arising from drought.

Population.—The Census of 1872 returned a total population of 719,375 persons. The Census taken on February 17th, 1881, disclosed a total population of 582,487 in Sholápur, showing a decrease of 136,888, or 19·02 per cent., since 1872, due entirely to mortality or emigration as the results of the famine of 1876–78.

The following are the main details shown by the Census of 1881:—Area, 4521 square miles; towns, 6; villages, 706, occupied houses, 81,203; unoccupied houses, 16,679. Average density, 128·84 persons per square mile; villages per square mile, 0·15; houses per square mile, 21·6; persons per village or town, 818, persons per house, 7·17. Males numbered 294,814, and females 287,673, proportion of males, 50·6 per cent. Classified according to sex and age, there were—under 15 years of age, boys 111,468, and girls 104,304; total children, 215,772, or 37·03 per cent.: 15 years and upwards, males 183,346, and females 183,369; total adults, 366,715, or 62·97 per cent.

Classified according to religion, Hindus number 530,121; Muhammadans, 43,967; Jains, 7514; Christians, 625; Parsis, 157; Jews, 94; Sikhs, 8; Buddhist, 1. The Hindus were sub-divided into—Bráhmans (priests and Government servants), 27,059, Rájputs, 2938; Chamars, 11,381; Darjis (tailors), 6222; Dhangars, 57,704; Dhobis (washermen), 4085; Nápits (barbers), 5959; Kunbis (cultivators), 178,908; Kolis (cultivators), 7530; Koshtis, 10,658, Lingájets (traders), 21,509; Lohárs (blacksmiths), 2938; Malis (gardeners), 23,898; Mangs (depressed caste), 19,233; Mhárs, 44,001; Sonárs (goldsmiths), 5087; Telis (oilmen), 6750; Beráds, 3404; Jangams, 3838; Kumbhárs

(potters), 3852; Sutárs (carpenters), 4824; and Banjárs (carriers), 3397. The Muhammadan population by race, as distinguished from descendants of converts, consisted of—Patháns, 4350; Sayyids, 3905; Shaikhs, 35,177; and 'others,' 535. According to sect, the Muhammadans were returned—Sunnís, 43,358; Shiás, 391; Wahábís, 3; and unspecified, 215. Among the Christians, 343 were Roman Catholics, 147 Protestants, and 135 of other Christian creeds. Adopting another principle of classification—native Christians numbered 399; Eurasians, 68; and Europeans, 158.

With regard to occupation, the Census distributes the male population into the following six main groups:—(1) Professional class, including all State, civil and military, officials, 11,314; (2) domestic servants, inn and lodging keepers, 3607; (3) commercial class, including bankers, merchants, carriers, etc., 5516; (4) agricultural and pastoral class, including gardeners, 135,064; (5) industrial class, including all manufacturers and artisans, 39,276; and (6) indefinite and non-productive class, comprising general labourers, male children, and persons of unspecified occupation, 100,037.

Of the 712 towns and villages in Sholápur District, 111 contain less than two hundred inhabitants; 243 from two to five hundred; 230 from five hundred to one thousand; 96 from one to two thousand; 16 from two to three thousand; 10 from three to five thousand; 3 from five to ten thousand; 2 from fifteen to twenty thousand; and 1 over fifty thousand. The most important towns are SHOLAPUR (city, 59,890; cantonment, 1391), PANDHARPUR (16,910), BARSÍ (16,126), KARKAMB (6421), KARMALA (5071), and SANGOLA (4726). All these, except Karkamb, are municipalities. Total municipal population (1881) 102,723; municipal income (1883-84), £25,839; the incidence of taxation per head of population varied from 4½d. (Pandharpur) to 5s. 2½d. (Sholápur).

Agriculture.—Agriculture supported (1881) 389,224 persons, or 66·82 per cent. of the population; 210,292 were agricultural workers.

The soil of Sholápur is of three kinds, *kálí* or black, *karad* or coarse grey, and *tambdi* or reddish. Except in the Bársi Sub-division, where black soil is the rule, and coarse grey is rare, most of the District is either grey or red. The black soil is almost confined to the banks of rivers and large streams.

Of the total area of the District, 4521 square miles, 3413 square miles were cultivated in 1881, of which 188 square miles were revenue-free. Area assessed for revenue, 3800 square miles. Total amount of Government assessment, including local rates and cesses on land, £111,965; average incidence of assessment, including local rates and cesses, 11½d. per cultivated acre.

The total area of Government land is 2,646,136 acres, namely,

2,400,243 acres, or 90·70 per cent., cultivable, of which 215,115 acres are alienated; 155,709 acres, or 5·88 per cent., uncultivable; 5449 acres, or 0·21 per cent., grass or *kurin*; 29,553 acres, or 1·12 per cent., forest; and 55,182 acres, or 2·09 per cent., village sites, roads, and river beds. In 1883-84, 1,763,340 acres were under actual cultivation, of which 22,282 were twice cropped. Cereals and millets occupied 1,330,781 acres, of which 923,706 acres were under *jair* (*Sorghum vulgare*), pulses, 185,528 acres; orchards, 3640 acres; drugs and narcotics, 2323 acres; condiments and spices, 7728 acres; sugar-cane, 5151 acres; oil-seeds, 189,235 acres; dyes, 468 acres; and fibres (cotton), 60,768 acres.

In 1883-84, the agricultural stock consisted of—cows and bullocks, 340,258; buffaloes, 72,499; horses, 11,158; donkeys, 4191; sheep and goats, 420,616; ploughs, 21,014; and carts, 11,901. Prices of produce, per *maund* of 80 lbs.—wheat, 5s. 5d.; rice, best, 7s. 5½d.; rice, common, 6s. 10½d.; *bijra* (*Pennisetum typhoideum*), 3s. 5½d.; *jair*, 3s. 4d.; gram, 3s. 10½d.; salt, 6s. 0½d.; flour, 6s. 7½d.; *dhil*, split-peas, 4s. 3½d.; *ghi*, £3, 12s. 6½d. The wages of skilled labour are from 6d. to 1s. 9d. per day; and of unskilled labour, 3d. to 1s.

On garden land manure is always used, and also on dry crop land when available. The usual mode of manuring a field is by turning into it a flock of sheep and goats, for whose services their owner is paid according to the length of their stay. Scarcity of manure is the main reason why so little land is watered, compared with the area commanded by the Ekrak lake and other water-works. An industrious farmer ploughs his land several times before he sows it, and weeds it several times while the crop is growing. An irregular rotation of crops is observed, and about a fifth or sixth part of the holding is often left unsown. As a rule, the poorer landholders neither weed nor manure their land. They run a light plough over it, sow the seed broadcast, and leave it to itself. They expect to get from it at best merely a bare food-supply for the year; and while the crop is ripening, they have to supplement their field profits by the wages of labour. Much of the best land is in the hands of money-lenders who have either bought it or taken it on mortgage. The tendency seems to be for the petty landholders to diminish, and the land to fall into the hands of men of capital who employ the old holders as their tenants or labourers. It may be accepted that only about 10 per cent. of the agricultural classes are free from debt, and that the remaining 90 per cent. are involved, advances from time to time under some shape being a necessity to them. The Relief Act, by protecting their property from attachment and sale for debt, has rendered this necessity less urgent. In 1882-83, including alienated lands, the total number of holdings was 49,656, with an average area of about 48 acres.

Irrigation.—The irrigation works in Sholapur District are the

Koregáon, Ashti, and Ekruk lakes. The first-named is an old work improved, and the two last are new works. Koregáon lake lies 13 miles north-east of Bársi, and is formed by throwing two earthen dams across two separate valleys. The smaller of the dams was breached in 1870. It is proposed to restore it. The lake will then have a capacity of 81 millions of cubic feet. The Ashti lake lies in the Mádhá Sub-division, 12 miles north-east of the town of Pandharpur. The lake when full holds 1499 millions of cubic feet of water. The Ekruk lake, the largest artificial lake in the Bombay Presidency, lies 5 miles north-east of Sholápur. The lake is 60 feet deep when full, and holds 3350 millions of cubic feet of water.

Forests.—The dry, shallow soil of the uplands of Sholápur District is ill suited for trees. The present area reserved for forests is 242 square miles, or about 5·35 per cent, of the total area of the District. The forest area is much scattered. It may be roughly divided into two tracts of forest land, on the hills between Bársi and the Nízám's territories in the extreme north-east, and on the hills to the south of Málsiras and Sângola in the extreme south-west. Before December 1871, when forest conservancy was introduced, Sholápur was extremely bare of trees and brushwood. Almost the whole land was taken for tillage. In December 1871, two square miles of scattered grass land or *kuran* were transferred to the Forest Department. During the twelve years ending 1883, these two miles have spread to 242 square miles. In the whole of the Sholápur forest area, no timber-cutting rights are admitted to exist. The forest lands are of two classes—scrub forest and *bábul* (*Acacia arabica*) meadows. The scrub forest is found on the hills, and *bábul* meadows occur all over the District. Of the total area, 24,885 acres consist of scrub forest, and 129,955 acres of *bábul* meadows.

Forest receipts are comparatively small, amounting to only £829 in 1882–83. About one-fifth of the forest reserves are yearly leased for grazing. The remaining four-fifths are leased yearly for grass-cutting, and in these, tree plantations are formed. Besides for fuel, the timber of the *bábul* and the *nim* (*Melia Azadirachta*) are used in making beams, posts, doors, carts, ploughs, and other field tools. The bark of the *bábul* and of the *tarrad* (*Cassia auriculata*) is used for tanning, and the pods as well as the flowers of the *palds* (*Butea frondosa*) are used for dyeing. The bark of the *spta* (*Bauhinia racemosa*) is made into ropes.

Natural Calamities.—The earliest recorded famine is the great Durgá Devi famine, which began about 1396 A.D., and is said to have lasted nearly twelve years. It arose from want of seasonable rain; and it is said to have spread over the whole country south of the Narbadá, and to have depopulated whole Districts. Next came the famine of 1460

A.D. About 1520, a great famine is said to have been caused by military hordes destroying and plundering the crops. The famine of 1791 was very severe, especially in the Karnátik, where the crops entirely failed. In the Deccan the yield was one-fourth to one-half the usual out-turn; but as thousands flocked from the Karnátik to the Deccan for food, the distress became very severe. During this famine, grain sold at 3 lbs. the shilling. In 1802, the plunder and destruction of crops by Holkar and the Pindáris caused a serious scarcity, which the failure of the rain in October and November 1803 turned into a famine of ruinous severity. In 1818, partly owing to the ravages made by the Peshwá's armies, and partly owing to the failure of crops, the District again suffered from famine, accompanied by cholera, which destroyed thousands of lives. Other famines or scarcities occurred in 1824, 1832-33, 1845, 1854, and 1862, owing to scanty rainfall.

In 1876, the scanty rainfall of 9·11 inches led to failure of the crops; and distress, amounting to famine, resulted over the whole District. In September and October, except one or two local showers, there was no rain; and no cold-weather crops were sown. Early in August the poorer classes began to show signs of distress, and, on the 4th September, Government sanctioned the opening of relief works. A favourable rainfall, at the opening of the rainy season of 1877, was followed by another long drought, which caused great suffering. Distress and anxiety continued till September and October, when a plentiful and timely rainfall brought down prices and gave much relief. At the close of November the demand for special Government relief ceased. A special Census taken on the 19th of May 1877, when famine pressure was general and severe, showed that of 62,712 persons employed on relief works, 3,471 were manufacturers or craftsmen, 21,840 were holders or sub-holders of land, and 37,401 were labourers. The total cost of the famine was estimated at £206,502, of which £186,184 was spent on public and civil works, and £20,318 on charitable relief. A considerable number of people, chiefly husbandmen, left the District and went to Berar and the Nizám's territory. During the drought a large number of cattle died. The cultivated area fell from 2,151,617 acres in 1876-77 to 2,136,988 in 1878-79.

During the cold season of 1879, from January to March, swarms of rats and mice appeared and ate the grain before it was ripe enough to harvest. Many fields were entirely stripped, and of others only a small portion was saved by gathering the ears while they were still green. About seven-eighths of the crops was wholly destroyed by rats. In Sholápur, about £660 was paid as reward for rats killed, at the rate of 2s. the hundred.

Trade, Communications, &c.—Besides 115 miles of the south-eastern branch of the Great Indian Peninsula Railway from Poona, entering the

District at Pomalvádi in the north-east corner, and crossing in a south-easterly direction towards Gulbarga in the Nizám's Dominions, and eight miles of the East Deccan line of the Southern Maráthá Railway, there are 382 miles of made roads. Of these, three are provincial and seven local fund. The three provincial lines are—the Poona-Haidarábád road, 78 miles; the Bársi road with its extension towards the Nizám's territory, 62 miles; and the Sholápur-Bijápur road, 19 miles. Of the seven local fund roads four are first-class—the Bársi-Pandharpur road, 30 miles; the Mohol-Pandharpur, 24 miles; the Pandharpur-Janoni, 42 miles; and the Jeur-Kármála with its extension towards Ahunadnagar and the Nizám's territory, 27 miles: three are second-class—the Sholápur-Bársi, 42 miles; the Sholápur-Akalkot, 15 miles; and the Jeur-Pandharpur, 43 miles.

Since the opening of the railway in that portion of the District between the Nizám's Dominions and Poona, trade has greatly increased. Next to cotton, a large proportion of which comes from without, the chief exports are oil, oil-seeds, *ghi*, turmeric, and cotton cloth. The imports are salt, piece-goods, yarn, gunny-bags, and iron-ware.

Trade is carried on at the towns and in markets, fairs, village shops, and also by travelling carriers. The largest centres of internal trade are Sholápur, Bársi, and Pandharpur, and next to these Vairág, Mádha, Mohol, Kármála, Akluj, Wate-Pate, and Sângola. Of these, Sholápur, Mohol, and Mádha are near the railway. The number of traders is about 6000, the chief being Lingáyats, Bhátiás, Gujárs, Vánis, Nagars, Márwáris, Bráhmans, Borahs, and Kshattriyas. Forty-two weekly markets are held in the District, at which petty traders, pedlers, and hawkers set up booths and offer for sale their goods, consisting of cotton, grain, groceries, spices, cloth, yarn, oils, earthenware, *ghi*, hides, fuel, etc. Of 19 trading fairs held in the District, one held at Sholápur on the 12th January, three held in Pandharpur in April, July, and November, and one held at Sonári in April, are the most important. The chief articles for sale are cloth, pots, grain, glass bangles, and live stock.

After agriculture, the chief industries of the District are spinning, weaving, and dyeing. The silks and finer sorts of cotton cloth—such as *dhotis* and women's robes—prepared in Sholápur bear a good name. Blankets are also woven in large numbers. Besides hand-loom weaving, a steam spinning and weaving mill, with 20,888 spindles and 175 looms, has lately been established at Sholápur city. Oil-presses of the native type are worked by Telis in many places, and saltpetre is manufactured to some extent by Mhars and Mángs.

Administration.—The revenue collected in 1882-83 from land was £98,990; from stamps, £6890; from excise, £13,110; and by the licence tax, £3210. Forest proceeds amounted to £820; the local

fund receipts were £6970; and the five municipalities raised an income of £24,615, the only peculiarity being a pilgrim-tax in Pandharpur, and a water-rate in Sholapur. The administration of the District in revenue matters is entrusted to a Collector and 4 Assistant Collectors, three of whom are covenanted civilians. The District is provided with the court of a senior Assistant Judge. For the settlement of civil disputes, there are 4 courts besides the above. Nineteen officers share the administration of criminal justice. The total strength of the regular police force for the protection of person and property consisted of 92 officers and 438 constables, giving 1 man to every 1099 of the population. The total cost was £8724, equal to £1, 18s. per square mile and 3½d. per head of population. There is one jail in the District.

Compared with 45 schools and 516 pupils in 1865, there were, in 1877, 115 schools, with a roll-call of 4648 names, or, on an average, 1 school for every five villages. In 1882-83, there were 176 Government schools, or an average of 1 school for every four villages, with an average attendance of 5708 pupils. Besides these Government schools, there were 4 primary schools inspected by the Educational Department. In 1869, the first girls' school was opened in Bārsi. In 1882-83, the number was 4 with 176 names, and an average attendance of 105. The Census of 1881 returned 8795 boys and 204 girls as under instruction, besides 18,824 males and 214 females able to read and write but not under instruction. Four vernacular papers were published in 1884.

Medical Aspects.—The climate, except from March to May, is healthy and agreeable. In the hot season, the mean temperature is 86° F., very hot and oppressive in the day-time, but cool at night. Mean temperature—January, 71·8° F.; February, 76·8° F.; March, 83·7° F.; April, 88° F.; May, 88·9° F.; June, 82·1° F.; July, 78·9° F.; August, 77·9° F.; September, 77·1° F.; October, 77·3° F.; November, 73·8° F.; December, 70·7° F.: annual mean, 78·9° F. In 1883, the maximum temperature at Sholapur was 109° F. in May, the minimum, 46·2° F. in December. The rainy season is pleasant; the sky is more or less overcast, and the rain falls in heavy showers, alternating with intervals of sunshine. The average annual rainfall for a period of 28 years ending 1881 was 28·6 inches. In 1883-84, the rainfall was 39·93 inches. The rainfall is generally unequally distributed, the fall in the western Sub-divisions being very scanty compared with that in the east. During the cold season, from November to February, the atmosphere, with keen easterly and north-easterly winds, is clear and bracing.

Besides fever of an intermittent type, skin diseases such as guinea-worm, itch, and ringworm are prevalent in the Bārsi and Kārmāla Sub-divisions, brought on chiefly by the badness of the well water. Fever

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makes its appearance at the end of the rainy season, being due in a great measure to the sudden change of climate. Cholera used every year to break out at Pandharpur during the periodical fairs; but improved sanitary arrangements have to some extent put a stop to this. In 1883-84, 4 dispensaries and the civil hospital at Sholapur afforded medical relief to 589 in-door and 50,037 out-door patients, and 26,000 persons were vaccinated. [For further information regarding Sholapur District, see the *Gazetteer of the Bombay Presidency*, published under Government orders, and compiled by Mr. J. M. Campbell, C.S., vol. xx, Sholapur District (Government Central Press, Bombay, 1884). Also *An Historical Account of the Poona, Sátára, and Sholapur Districts*, by Mr. W. W. Loch, C.S. (Government Central Press, Bombay, 1877); the *Bombay Census Report* for 1881; and the several annual Administration and Departmental Reports of the Bombay Government.]

Sholapur.—Sub-division of Sholapur District, Bombay Presidency; situated in the extreme south-east between $17^{\circ} 22'$ and $17^{\circ} 50'$ N. lat., and between $75^{\circ} 40'$ and $76^{\circ} 13'$ E. long. Area, 847 square miles. Population (1872) 181,928; (1881) 149,539, namely, males 76,324, and females 73,215; occupying 20,261 houses, in 1 town and 146 villages. Hindus number 123,589; Muhammadans, 23,253; and 'others,' 2697. Sholapur is waving and devoid of trees, rising in places in small hillocks showing bare rock. The climate is dry; the cold season is clear and bracing. The two chief rivers are the Bhíma and the Sína. The Bhíma forms the southern boundary for about 35 miles; and the Sína runs south through the Sub-division for about 40 miles. In 1882-83, including alienated lands, the total number of holdings was 9533, with an average area of about 54 acres. In 1882-83, the area under actual cultivation was 336,182 acres, of which 7532 acres were twice cropped. Cereals and millets occupied 272,200 acres, of which 234,263 acres were under *jowar* (*Sorghum vulgare*); pulses, 28,467 acres; oil-seeds, 30,341 acres; fibres, 8540 acres; and miscellaneous crops, 4166 acres. In 1883 the Sub-division contained (including the District head-quarters) 2 civil and 8 criminal courts; police circles (*thánds*), 6; regular police, 280 men; village watch (*chavkidárs*), 228. Land revenue, £16,923.

Sholapur.—Chief town of Sholapur District, Bombay; situated in lat. $17^{\circ} 40' 18''$ N., and long. $75^{\circ} 56' 38''$ E., on the plain of the Sína, 150 miles by rail from Poona. Area, $8\frac{1}{2}$ square miles, or 5260 acres. Population (1881) of city, 59,890; of cantonment, 1391; total, 61,281, namely, males 31,282, and females 29,999, occupying 8330 houses. Hindus number 44,387; Muhammadans, 14,780; Jains, 1385; Christians, 511; Parsis, 127; and 'others,' 91.

The small but strong fort in the south-west corner of the city, surrounded by a ditch, is ascribed to Hasan Gangu, the founder of the

Bahmani dynasty (1345). On the dissolution of that kingdom in 1489, Sholapur was held by Zein Khán. But during the minority of his son it was, in 1511, besieged and taken by Kamál Khán, who annexed it, with the surrounding Districts, to the Bijápur kingdom. In 1523, Sholapur formed part of the dowry of Ismáil Adil Sháh's sister, given in marriage to the King of Ahmadnagar. But not being handed over to the Ahmadnagar kingdom, it formed for forty years a source of constant quarrels between the two dynasties, until it was given back to Bijápur as the dowry of the Ahmadnagar princess Chánd Bísí (1562). On the overthrow of the Bijápur kingdom (1686), Sholapur fell to the Mughals, from whom it was taken by the Maráthás. At the close of the war with the Peshwá in 1818, it was stormed by General Munro.

Since then, the town, no longer exposed to the raids of robbers, has been steadily increasing in importance. Its convenient situation between Poona and Haidarábád has made it, especially since the opening of the railway in 1859, the centre for the collection and distribution of goods over a large extent of country. The chief industry of Sholapur is the manufacture of silk and cotton cloth, more than 5000 persons being engaged as hand-loom weavers, spinners, and dyers. A steam weaving and spinning mill has been established in the town. The machinery is driven by two engines each of 40 horse-power, works 20,888 spindles and 175 looms, and employs 850 hands.

Sholapur town is situated in the centre of a large plain 1800 feet above sea-level, on the watershed of the Adila, a feeder of the Sina. To the south-west, close to the city wall, lies the fort of Sholapur, and farther on are the officers' bungalows of the old cavalry lines, now mostly occupied by railway servants, and the railway station. To the south of the city is the Siddheswar lake, with a temple in the centre. On the south-east bank of the lake is the municipal garden; and about 1000 yards more to the south-east are the Collector's office and bungalow. About 100 to 500 yards south-west of the Collector's office stretch the officers' bungalows of the old cantonment; from 50 to 100 yards west of the officers' bungalows are the Protestant church, the Roman Catholic chapel, and the post-office. About 1000 yards south-east of the *Sadr Bazar* are the Native Infantry lines, and to the south of the lines are the officers' bungalows in the present cantonment limits. The greater part of the old military cantonment of Sholapur has been transferred to the civil authorities, and is now included within municipal limits. The present cantonment covers an area of about 600 acres, just enough for a single Native Infantry regiment. Since the removal of the Native Infantry regiment in 1877, the fort has been placed in charge of the civil authorities.

The city was formerly enclosed by a wall $2\frac{1}{2}$ miles in circuit. About 1872, to give room to the growing town, the municipality pulled down

the whole of the east wall and parts on the south-west and north. The walls, where standing, are 8 to 10 feet high, 4 to 6 feet wide at the base, and 3 to 4 feet wide at the top.

Sholápur fort is an irregular oblong about 230 yards by 176, enclosed by a double line of lofty battlemented and towered walls of rough stone 10 to 20 yards apart, and surrounded, except on the east or Siddheswar lake side, by a wet moat 100 to 150 feet broad and 15 to 30 deep. The whole work is Muhammadan, the outer wall dating from the 14th century, and the inner wall and four great square towers from the 16th and 17th centuries. The outer wall, with battlemented curtains and four corner and 23 side towers, is pierced for musketry; and with openings and vaulted chambers for cannon, rises 20 to 30 feet from the edge of the moat. About 20 yards behind, the inner wall, also towered and battlemented, rises 5 to 10 feet above the outer wall. The inner wall has about 25 towers, exclusive of the four square towers.

Besides the courts of the Sub-divisional and District revenue officers, there are the senior assistant's and the subordinate judge's courts. The houses are mostly built of mud, but sometimes of stone and burnt bricks, and are covered with flat roofs. On account of the absence of any high ground in the neighbourhood, Sholápur is on all sides exposed to the winds. The climate, except during the months of March, April, and May, is agreeable and healthy. The municipality, established in 1853, had an income in 1883-84 of £15,496; incidence of taxation, 5s. 2½d. per head of population. The chief municipal undertaking has been the water-works, which form the chief source of the city water-supply. They were constructed by the municipality between 1879 and 1881, and give a daily supply of about 6 gallons a head. The water is drawn from the Ekruk lower level canal through a line of 10-inch pipes into a settling tank, and thence pumped by steam-power.

Sholavandán.—Town in Madura *táluk*, Madura District, Madras Presidency; situated in lat. 10° 2' 30" N., and long. 78° 2' E., 12 miles from Madura city, on the Vaigai river. Population (1881) 3050, inhabiting 528 houses. Hindus number 2817; Muhammadans, 163; and Christians, 70. The town was built in 1566 by a colony of Vallálars, relatives of the Vijayanagar Governor. The fort commanded a pass on the main road from Dindigul to Madura, and was occupied by Muhammad Yusaf in 1757, to cover the operations of Calhaud against Madura. In the same year it was captured by Haidar Ali, and retaken by the British.

Sholinghar (*Sholangipuram*).—Town in North Arcot District, Madras Presidency. Lat. 13° 7' N., long. 79° 29' E. Population (1881) 5697, inhabiting 797 houses. Hindus number 5483; Muhammadans, 208; Christians, 6. Ten miles from Banáveram station, on the south-west line of the Madras Railway. The scene of one of Coote's greatest

victories in 1781, when, for the third time within a few months, acting on the offensive, with vastly inferior numbers, he drove Haidar Ali's picked troops before him. There is a famous temple here, perched on a high rock, which is much frequented by pilgrims.

Shorápur.—Formerly a tributary State of the Nizám; situated in the south-west corner of the Hajdarábád territory, and since 1860 an integral part of the Nizám's Dominions. Bounded on the north by Hajdarábád territory, and on the south by the Kistna, which separates it from the Raichúr Doab. Chief town, Shorápur; lat. $16^{\circ} 31' N.$, long. $6^{\circ} 48' E.$

By the treaty of 1800, the British Government engaged to enforce the just claims of the Nizám against Shorápur. In 1823, the British Government, having succeeded to the rights of the Peshwá, relinquished the tribute due to it from the Shorápur Rájá, on condition of the Rájá abandoning certain *rusúms* (revenue claims) on the neighbouring British Districts. A succession dispute in 1828 commenced a long series of disasters for Shorápur. The State fell into hopeless arrears to its suzerain the Nizám, and in 1841-42 the portion of it to the south of the Kistna was ceded to the Nizám in commutation. A British officer, Captain Gressly, was in the same year deputed to report on the Shorápur State. He was succeeded by Captain Meadows Taylor (1842), into whose hands the practical administration fell, as the sequel of a series of *zanána* intrigues, domestic quarrels, and acts of extravagance by members of the Rájá's family. The improvements effected by Captain Meadows Taylor, and the era of prosperity and order which he introduced at Shorápur, form a brilliant example of the administration of a Native State by a British officer. They are recorded with veracity in Meadows Taylor's *Story of My Life*.

On the departure of Captain Meadows Taylor in 1853, the affairs of the State began to slip back into their former condition, and the old unsatisfactory relations with the Nizám revived. The Rájá threw in his lot with the rebels in the Mutiny of 1857-58, was sentenced to deportation, and shot himself. By the British treaty of 1860, Shorápur State was ceded to the Nizám in full sovereignty, and has since been an integral part of the Nizám's Dominions.

The State was founded in the 13th century by a chief of the Bedars, a race of aboriginal descent, numerous in Mysore and in the Southern Maráthá Country. The chiefs were styled Naiks. The Bedars were originally freebooters, but in course of time acquired considerable power. Their bands took service under the kings of Bijápur and Golconda, and assisted the Maráthás in the contest with Aurangzeb. They seldom commit murder, and are not petty thieves. A traditional knowledge of the customs and laws of the tribe is preserved by their elders and chiefs. The Bedars are fine athletic men, fond of hunting

and open-air pursuits. Their moral code is high, and they are said never to violate their oath; but they are illiterate. [For an account of the Bedars and their customs, see Meadows Taylor's *Story of My Life*, pp. 210, 211 (second edition).]

Shorkot.—South-western *tahsil* of Jhang District, Punjab. Area, 1220 square miles; number of towns and villages, 174; houses, 17,197; families, 20,615. Population (1881) 95,342, namely, males 52,727, and females 42,615. Average density, 79 persons per square mile. Classified according to religion, Muhammadans number 77,616; Hindus, 17,355; Sikhs, 367; and Christians, 4. Of the 174 towns and villages, 109 contain less than five hundred inhabitants; 39 from five hundred to a thousand; and 26 from one to five thousand. Principal crops—wheat, *jodr*, gram, and cotton. Revenue of the *tahsil*, £11,985. The administrative staff consists of a *tahsildar*, and an honorary magistrate; number of police stations (*thānds*), 2; strength of regular police, 51 men; village watch or rural police, 102.

Shorkot.—Ancient town in Jhang District, Punjab, and headquarters of Shorkot *tahsil*; situated in lat. 30° 50' N., and long. 72° 6' E., among the lowlands of the Chenāb, about 4 miles from the left bank of the river, and 36 miles south-west of Jhang town. The modern town stands at the foot of a huge mound of ruins, marking the site of the ancient city, surrounded by a wall of large antique bricks, and so high as to be visible for 8 miles around. Gold coins are frequently washed out of the ruins after the rains. General Cunningham identifies Shorkot with a town of the Malli attacked and taken by Alexander, and visited by Hiuen Tsiang ten centuries later. General Cunningham infers, from the evidence of coins, that the town flourished under the Greek kings of Ariana and the Punjab, as well as under the Indo-Scythian dynasties up to 250 A.D. It was probably destroyed by the White Huns in the 6th century, and reoccupied in the 10th by the Brāhman kings of Kābul and the Punjab. The modern town is a place of little importance. Population (1881) 2283, namely, Hindus, 1167; Muhammadans, 1104; and Sikhs, 12. Number of houses, 365. Municipal income (1883-84), £153. The town is surrounded by fine groves of date-palms. Many of the buildings are lofty, but most of them are more or less in a state of ruin. A good *bāzār*, with a gate at each end, and lined with shops built on a uniform plan; but few of the shops are tenanted. *Tahsil*, police station, dispensary, school, and rest house.

Shrávan-belgola (lit. '*Tank of the Śrājavans or Jains*').—Village in Hassan District, Mysore State; situated in lat. 12° 51' 10" N., and long. 76° 31' 31" E., between two rocky hills called Chandra-betta and Indra-betta. Population (1881) 1315. According to Jain tradition, Bhadrā Bahu, one of the six immediate disciples of the founder of

their religion, died here while leading a colony from Ujjain into Southern India. He is said to have been accompanied by the celebrated Emperor Chandragupta, who had abdicated the throne and adopted the life of a hermit. These events, borne out by a rock inscription of great antiquity, are assigned to the 4th century B.C. The grandson of Chandragupta is also related to have visited the spot.

On the summit of Chandra-betta stands the colossal statue of Gomateswara, 60 feet high, surrounded by numerous buildings. The hill itself is 3250 feet above sea-level. An inscription on the foot of the statue states that it was erected by Chámunda Rája, whom tradition places about 60 A.C. The surrounding enclosures bear the name of Gangá Rája, who belongs to the Hoysálá Ballála period.

The statue is nude, and stands facing the north. The face has the serene expression usually seen in Buddhist statues; the hair is curled in short spiral ringlets over the head, while the ears are long and large. The figure is treated conventionally, the shoulders being very broad, the arms hanging down the sides with the thumbs turned outwards, the waist small. The feet are placed on the figure of a lotus. Representations of ant-hills rise on either side, with figures of a creeping plant springing from them, which twines over the thighs and arms, terminating in a tendril with bunches of fruit. These symbolize the complete spiritual abstraction of a *yogi*. According to the most reasonable hypothesis, the statue must have been cut out of a rock which projected above the hill; or perhaps the solid summit of the hill may have been itself cut away. The workmanship is still as sharp as if the stone had been newly quarried. Within the enclosure are 72 small statues of a similar description in compartments.

On the face of the opposite rock of Indra-betta are inscriptions cut in ancient characters a foot long. Shrāvan-belgola is known to have been an ancient seat of Jain learning, and is still the residence of the chief *gurus* of that sect; but the establishment was deprived of many of its privileges and emoluments by Tipú Sultán. There is a considerable manufacture of brass utensils, which are exported to distant parts.

Shrīgonda.—Sub-division and town in Ahmadnagar District, Bombay Presidency.—*See* SRIGONDA.

Shrivardhan.—Town in Janjira State, Bombay Presidency.—*See* SRIWARDHAN.

Shujábád.—*Tahsil* of Miltán District, Panjab. Area, 322 square miles; number of towns and villages, 80; houses, 12,301; families, 13,658. Population (1881) 61,622, namely, males 33,394, and females 28,228. Average density, 191 per square mile. Classified according to religion, Muhammadans number 50,705; Hindus, 10,747; Sikhs, 144; Jain, 1. Of the 80 towns and villages in the *tahsil*, 37 contain

less than five hundred inhabitants; 22 between five hundred and a thousand; 20 between one and five thousand; and 1 between five and ten thousand. Average area under cultivation for five years ending 1881-82, 110 square miles, or 70,580 acres; principal crops—wheat, 25,839 acres; rice, 5018 acres; *jowar*, 4533 acres; indigo, 14,710 acres; cotton, 5880 acres; and sugar-cane, 4180 acres. Revenue of the *tahsil*, £16,452. One *tahsildār's* court; strength of regular police, 59 men; village watch or rural police, 99.

Shujābād.—Town and municipality in Mūltān District, Punjab, and head-quarters of Shujābād *tahsil*; situated in lat. 29° 53' N., and long. 71° 20' E., about 5 miles from the present left bank of the Chenāb. Population (1881) 6158, namely, Hindus, 3970; Muhammadans, 2476; Sikhs, 9; and 'others,' 3. The fort was built by Shujā Khān, one of the Nawābs of Mūltān under Ahmad Shāh Durāni, in whose time the town possessed some importance. Municipal income (1883-84), £724, or an average of 2s. 2½d. per head. The town is chiefly built of brick, and contains some fine native houses. It is the trade centre for the richest portion of the District, and is intersected by two broad *bāzārs* which cross each other. North-west of the town is the palace of Shujā Khān, a collection of rather fine brick buildings, now used as the *tahsil* and police station. Dispensary, school of the Church Missionary Society, *sardī* or native inn, and encamping ground. The surrounding country is irrigated by the Gajjūhatta and Bakhtūwah canals, and yields fine crops of indigo and sugar-cane. Municipal income in 1875-76, £656, or 2s. 1d. per head of population (6268) within municipal limits.

Shūtar Gardan.—Mountain pass in Afghānistān, dividing the Kurām and Logar valleys. An important position, commanding the road to Kābul, the possession of which, on the occasion of the retributive campaign after the massacre of Sir Louis Cavagnari in September 1879, enabled General Sir F. Roberts' force to advance on that city and occupy it almost without opposition. The ascent of the pass from the Indian side is slight, though the descent into the Logar valley is long and very steep.

Shwe An-daw.—Pagoda in Thayet-myo District, Pegu Division, Lower Burma; situated a few miles north of Thayet-myo town. It dates from the time of Nara-pad-dī-si-thu, King of Burma (about 1167 A.D.), who is noted for his piety, his communication with Ceylon, and his frequent journeys through his dominions. He is said to have received from Ceylon a sacred tooth of Gautama; and while escorting it to his capital, he was warned by portents to deposit it at the place where this pagoda now stands.

Shwe-Dagon.—The great Pagoda of Rangoon, Lower Burma, and the most venerated object of worship in all the Indo Chinese countries.

Lat. $16^{\circ} 46' 40''$ N., long. $96^{\circ} 13' 50''$ E. The annual festival in March is attended by pilgrims from all parts; and so great is its renown that the King of Siam, not long ago, had a handsome *ajai* or resting-place built near. The pagoda stands upon a mound partly natural, partly artificial, in the angle formed by the junction of the Rangoon and Pegu rivers. This mound has been cut into two terraces, the upper of which is 166 feet above the level of the ground, and 900 feet long by 685 wide. The southern approach is covered with handsomely carved wooden roofs, supported on massive teak and masonry pillars, and has at its foot two immense griffins, one on each side. From the centre of the platform rises the profusely gilt, solid brick pagoda, springing from an octagonal base, with a perimeter of 1355 feet, and a gradually diminishing spheroidal outline, to a height of 321 feet, and supporting a gilt iron network *si* or umbrella in the shape of a cone, and surrounded with bells.

The space around the pagoda is left free for worshippers; but all along the edge of the platform are numerous idol-houses, facing inwards, containing images of Gautama in the usual sitting posture, and in a previous existence receiving from Dipengara, one of his predecessors, the prophetic announcement that he too should, after the lapse of four *thin-kye* (a *thin-kye* consists of a unit followed by 140 cyphers), and the creation and destruction of 100,000 worlds, attain to Buddha-hood. Strictly speaking, the word *thin-kye* is a corruption of the Sanskrit *asankhya*, meaning innumerable. Between these idol-houses and the main edifice are several bells, and *ta-gun-daing* or sacred posts, each surmounted by the figure of a Karawak (the carrying bird of Vishnu). The bells are struck by the worshippers with deer antlers, left near for that purpose. On the east side is an enormous bell, 7 feet $7\frac{1}{2}$ inches in diameter at the mouth, which was presented by Bo-daw Payá.

The whole of the early history of this pagoda must be rejected as untrustworthy, but the legend concerning its erection assigns it to the year 588 B.C. The story goes that it was built by two brothers who were guided by a *nât* or spirit into the presence of Gautama, who presented them each with four hairs, and bade them deposit them with certain other relics which had been left by his predecessors on a mountain in Pegu. The guardian of the earth pointed out this peak to the young men, and the sacred gifts were deposited on it under a tree. The first accounts in which any confidence can be placed are those relating to Shin-tsaw-bú, a queen who ruled early in the 16th century. The pagoda has been several times added to and re-gilt—the last time in 1871, when, with the sanction of the British Government, the King of Burma sent a new *si* from Mandalay, valued at £62,000. The name Shwe-Dagon is derived from the Talang word *tskún*, meaning 'a tree

or log lying athwart,' which has been corrupted in Burmese into Dagon or Dagon. The Burmese word *shwe* means 'golden.' During the first Anglo-Burmese war in 1825-26, the site of the pagoda was abandoned by the Burmese on the fall of Rangoon, and occupied by British troops till the close of the war. In 1852, during the second war, the Burmese anticipated that the British would attack from the south side, which was accordingly defended. But an entrance was effected by our troops on the east, and the great Shwe-Dagon pagoda fell a second time into the hands of the British. The hill on which it stands has been strongly fortified.

Shwe-daung.—Township in Prome District, Pegu Division, Lower Burma. Lat. $18^{\circ} 28'$ to $18^{\circ} 50' N.$, long. $95^{\circ} 10'$ to $95^{\circ} 23' E.$ Bounded by Tharawadi on the south, and by the Irawadi on the west. The eastern limit is marked by the low Taung-gyi Hills, which extend from near Prome town into Tharawadi District, and are covered with *eng* trees, forming a tract called the In-daing or *eng* country. Area, 204 square miles. Population (1881) 55,140; imperial revenue, £11,293, and land revenue, £2555. The township comprises 16 revenue circles, each under a *thugyi*. It consists for the most part of a plain, almost entirely under rice. Tobacco and vegetables are grown along the bank of the Irawadi. In the north-east, below Shwe-daung town, palm-trees are cultivated, and from these are extracted large quantities of *tari* (toddy). In the rains, the south-west corner of the township is separated by the Dún-ka-la channel from the Irawadi, and becomes an island. About 5 miles south of Shwe-daung is the Thin-bhyu Lake, supplied by the Irawadi, and 15 feet deep in the rains. The great northern road and the Burma State Railway from Rangoon enter the township through the In-daing, striking the Irawadi at Shwe-daung, whence it proceeds northwards to Prome. This township contains the Shwe-nat-taung Pagoda, the scene of an annual religious fair.

Shwe-daung.—Chief town of the Shwe-daung township, Prome District, Pegu Division, Lower Burma; situated about 8 miles below Prome, on the left bank of the Irawadi, and on the great road from Rangoon to the north. Lat. $18^{\circ} 42' N.$, long. $95^{\circ} 17' 30'' E.$ Divided into two quarters by the Kula-chaung. This town is of recent growth, the old Shwe-daung or Shwe-daung Myoma, mentioned in ancient records, being now only a village some miles farther south, opposite Pa-daung. Population (1881) 12,373, namely Buddhists, 12,118; Muhammadans, 214; Hindus, 25; Christians and 'others,' 16. Accessible by large boats, Shwe-daung forms the port of the Paung de and In ma rice plains, the produce of which is largely sent to Prome. The town contains the courts and usual public buildings; also numerous pagodas, monasteries, and *zayats*, or rest houses.

Shwe-gyin.—District in the Tenasserim Division, Lower Burma;

lying in the valley of the Sit-taung river. Area, 5567 square miles. Population (1881) 171,144 souls. Bounded on the north by Taung-ngu District; on the east by the Paung-laung range and the Salwin Hill Tracts; on the south by Amherst District; and on the west by the Pegu Yoma Hills. After the second Anglo-Burmese war, this District included the Salwin Hill Tracts and also the Tha-tun Sub-division of Amherst District, and was first called the Martaban Province, and then Martaban District. In 1864-65, Martaban was joined to Amherst, and the District was called Shwe-gyin. In 1872, the Sub-division of Yunza-lin was formed into an independent jurisdiction now known as the Salwin Hill Tracts. Several small transfers have taken place since. Head-quarters at SHWE-GYIN TOWN.

Physical Aspects.—In the north, the District is highly mountainous, both the eastern and western ranges sending down numerous spurs which on the east approach to within a few miles of the Sit-taung. Both chains diminish in height towards the south, and the Pegu Yomas recede, leaving a wide stretch of fertile land. South of Kyaik-to, a town at the southern base of the Paung-laung Hills, the whole country between the Sit-taung and the Bi-lin consists of vast monotonous plains, covered with scrub forest or almost impenetrable elephant grass. At places, a pagoda, or a group of houses surrounded by a few tall palms, marks the village of some fishermen or salt-boilers, who gain a precarious livelihood from the muddy waters of the tidal creeks or the salt-impregnated soil. At high tides, the whole of the coast for miles inland is inundated; and so rapidly does the sea advance over the flats, that little or no chance is offered to the fisherman or turtle-seeker should he have neglected the warning sound of the approaching waters. During the dry season, the upper portion of these plains is easily passable by carts; but in the rains they become one vast sheet of water, with the tops of the tall elephant grass showing above, and almost concealing the pagodas, by which alone the boatman can guide his course.

Both the Pegu Yomas and the Paung-laung mountains are densely wooded, and drained by small perennial streams. The passes over the former are mere tracks winding up ravines, and along the crests of spurs. Across the Paung-laung range are three principal routes,—the northern runs up the valley of the Baw-ga ta and across the Thayet-pin-lin-dat Hill to Kaw-lu-do, the northern police-post in the Salwin Hill Tracts, the central road goes up the valleys of the Mut-ta-ma and the Me-de to Pa-pun; the southern leads from the source of the Mut-ta-ma to Pa-wa-ta. The Paung-laung range, at the Sek-le hill opposite Shwe-gyin, attains a height of about 4000 feet, and terminates above Kin-ywa in Ke-la-tha, a peak crowned by a conspicuous pagoda, said to have been founded many years ago at the same time as Kyaik-ti-yo, above Sit-taung.

The chief rivers of Shwe-gyin District are the SIT-TAUNG, also called the Taung-ngu and the Paung-laung; and the BI-LIN or Dun-wun. The Sit-taung rises in Upper Burma, and enters Shwe-gyin at its northern end, and, after an exceedingly tortuous course, falls into the Gulf of Martaban by a funnel-shaped mouth 7 or 8 miles wide, up which the spring-tides rush with great violence, forming a bore. This river is navigable throughout its entire length in this District by large boats and steam launches. A chopping sea follows the rolling crest of the bore, and sometimes wrecks a boat in a few minutes.

The most important affluents of the Sit-taung are—the Kun, rising in the Pegu Yomas, and, after an east-south-east course of 60 miles, joins the main stream near Anan-baw; the Ye-nwe, which flows into the Sit-taung, after a south-easterly course of 90 miles, about 6 miles north of Shwe-gyin town; the Youk-thwa, navigable for a few miles above its mouth; the Mun; the Shwe-gyin; and many smaller streams.

The Bi-lin rises in the Salwin Hill Tracts, and runs a southerly course to the Gulf of Martaban. At first it is a rocky mountain torrent, but as soon as it emerges into the plains it deepens rapidly. During the rains it forms the highway between the Sit-taung and Maulmain. At spring-tides, a bore rushes up this river also, inundating the country around for miles. Its feeders are few and insignificant; but during the rains it communicates on the east with the Dun-tha-mi, and on the west with the Sit-taung and intervening rivers.

Shwe-gyin contains five lakes, viz. Tun-daw, Sa-win, Mwe-din, Mi-chaung-gaung, and Nga-thwe-zut. The District has never been surveyed from a geological point of view. The Paung-laung range is composed of gneissose rocks, and the whole of the level and alluvial plains are occupied by a sandy and very homogeneous deposit. Laterite formations prevail at places. The District is said to be rich in minerals. Gold occurs in most of the tributaries of the Shwe-gyin river (lit. 'gold-washing'), but the quantity found does not repay the labour of washing. Copper, lead, tin, galena, antimony, and coal also exist, but are not worked. The chief varieties of timber are teak, *pyin-gado* (*Nyha dolabriformis*), *pyin-ma* (*Lagerstroemia Flos-Reginae*), and *thit-tsi* (*Melanorrhæ usitata*).

Population.—The Census of 1872 disclosed a population of 129,485, and that of 1881, 171,144 persons, on an area of 5567 square miles, dwelling in 1 town and 558 villages, and occupying 31,868 houses; unoccupied houses numbered 1617. Density of population, 30·74 persons per square mile; villages per square mile, 0·10, or one village to each 9·9 square miles; houses per square mile, 6·01; persons per occupied house, 5·37. Total population, 171,144, namely, males 89,637, and females 81,157. Classified according to sex and age, there were—under 15 years, boys 39,072, and girls 35,523; total children,

4,595, or 43·6 per cent. of the population: 15 years and upwards, males 50,615, and females 45,934; total adults, 96,549, or 56·4 per cent. Classified according to religion, Hindus numbered 958; Muhammadans, 855; Christians, 1250; Buddhists, 158,149; Nat-worshippers, persons of indigenous race whose sole religion consists in a kind of worship of spirits or 'demons,' 9932. Christians were divided into European British subjects, 14; Eurasians, 40; and native converts, 196. Of the last-named, 1169 were Baptists. The Muhammadans were thus returned according to sect—Sunnīs, 673; Shiās, 132; and others, 50.

Classified ethnologically, in the language table of the Census report, Karens numbered 52,400, Burmese, 80,195; Talangs, 22,282; Saungthas, 5715, Shans, 8135; natives of India, 1780; Chinese, 280; Europeans and Eurasians, 54, 'others,' 303. The Karens are most numerous in the tract east of the Sit-taung, and belong to two great families, Sgaw and Pwo; many of them have been converted to Christianity by the American Baptist missionaries. The Talangs chiefly inhabit the plains; the Burmese, the country lying north of the Sit-taung. The Saungthas, who are engaged in the rearing of silkworms, are found mainly on the eastern slopes of the Pegu Yomas in Baw-ni. The Hindus, Muhammadans, and Chinese are all immigrants since the British occupation, as are also many of the Shans, of whom a whole colony settled some years ago at Win-ka-nin, at the junction of the Tut-ta-ma and Shwe-gyin rivers.

As regards occupation, the Census of 1881 returned the following six groups:—(1) Professional, including civil and military officials, males 2086, and females 108; (2) domestic servants, inn and lodging keepers, males 80, and females 52; (3) commercial class, including bankers, merchants, carriers, etc., males 2977, and females 2449; (4) agricultural and pastoral class, including gardeners, males 30,393, and females 27,351; (5) industrial class, including all manufacturers and artisans, males 6768, and females 10,332; and (6) indefinite and non-productive class, comprising children, general labourers, and persons of unspecified occupation, males 47,383, and females 41,165. The boat population numbered 1312, namely, males 1122, and females 190, living in 290 boats.

The only place in the District with more than 5000 inhabitants is SHWE-GYIN town, founded in the last century before the Burmese conquest by Alompra. It contains the usual public buildings; population (1881) 7519. Other towns are—KYAIK-TO, an old town at the foot of the Paung-laung range, containing a court-house, market-place, and police station; BI-LIN, with a population of 2606, founded in 1824, and containing a court-house and the usual public offices; SITTAUNG, on the Sit-taung river, said to have been built in 588 A.D., &c.

court-house, etc.; WIN-BA-DAW, noted for its manufacture of pottery, and as the chief halting-place for boats proceeding up the Sit-taung; KYAUK-GYI, at the foot of the Paung-laung mountains, 34 miles above Shwe-gyin, with trade in areca-nuts; Mún, Thú-yeh-tha-mí, Pú-zun-myaung, with manufacture of pottery; Nyaung-le-bin, etc. Out of the 559 towns and villages in the District in 1881, no less than 233 contained less than two hundred inhabitants, and 250 from two to five hundred; while 61 had from five hundred to one thousand, 14 more than one thousand, and only 1 above five thousand.

Agriculture.—Agriculture supports 117,263 persons, or 68·52 per cent. of the population. Of the total area of the District (5567 square miles), 174 square miles were cultivated in 1881, of which 10·2 square miles were non-revenue-paying; the remainder, 163·8 square miles, were assessed for revenue; the area still available for cultivation being 3581 square miles. Total amount of Government assessment, including local rates and cesses on land, £15,892; average incidence of assessment, 3s. 0½d. per acre of cultivated land. Average number of acres per head of agricultural population, 0·95. The most fertile portions lie along the right bank of the Sit-taung river, towards the south. The principal crop is rice, of which 25 varieties are enumerated. Areca-nuts are very largely grown on the hillsides, near running streams, the water being diverted into the palm groves by artificial channels. Cotton is sown in the *taungyas* or hill-clearings, where the hill tribes carry on a nomadic agriculture. Tobacco, vegetables, and oil-seeds are also produced, but the out-turn is small. Rice is the only crop of which the cultivation has steadily increased. In 1883-84, the area under rice was 87,908 acres; sugar-cane, 3040; vegetables, 1357; areca-nuts, 3738; mixed fruit-trees, 2284; cotton, 1; oil-seeds, 724; plantains, 885; betel-leaf, 414; tobacco, 57; cocoa-nut, 7; *taungyas* cultivation, 15,050; and land under miscellaneous cultivation not assessed, 649 acres; total area of cultivated land, 116,114 acres, or 181·4 square miles. The area under rice in 1871-72 was 50,773 acres. The chief rice tracts are in the Kaw-li-ya, Kwin-da-la, Nyaung-le-bin, Ye-hla, Kyauk-gyi, and Gamun-aing circles, the last being the most important. The average size of a holding is between 3 and 4 acres. As a general rule, the land is held by small proprietors, and is very rarely rented out, and never for a long term of years. Occasionally labourers are hired for rice cultivation, and are always paid in kind.

In 1883-84, the average rate of rent of land suited for rice was returned at 5s. 6d. an acre; the average produce per acre being 900 lbs. Price of produce per *maund* of 80 lbs.—rice, 6s. 6d.; cotton, 11s.; sugar, 11s.; salt, 4s. 9d.; tobacco, £4, 5s. 3d.; oil-seeds, 8s.; 12-15, 5s. The price of a plough bullock is £7; sheep and goats, each

16s.; fish, per lb., 3d. The agricultural stock consisted of—cows and bullocks, 19,410; horses and ponies, 211; sheep and goats, 1075; pigs, 5000; elephants, 161; buffaloes, 34,938; carts, 7556; ploughs, 7321; and boats, 1571.

Manufactures, etc.—The only manufactures in the District are pots, salt, and silk-spinning. The pots are made at Pu-zun-myaung, a village a few miles above Shwe-gyin town, where clay is procured on the spot; at Kwin-dala, a little lower down; at Sheip-gyi in the Kyauk-gyi township; and at Win-ba-daw in the Sit-taung township. At Pu-zun-myaung, the pots are made for export to Rangoon and Maulmain and intermediate towns, but at the other places for local use only. The largest-sized pots are sold for 10s., and the others for 3s. per hundred. Each kiln holds 1000 pots, among which are about 200 of the largest kind. The annual produce of one man's labour is estimated at 1000 unburned pots a month, or 7000 in the season, *i.e.* from November to May. The industry has been in existence for about thirty years. The pots made at Win-ba-daw are solely for the salt-boilers, the pot-makers exchanging for salt, delivered at the rate of 365 lbs. for every 100 pots. The yearly out-turn averages 15,000 pots.

In the Bhaw-ni and Anan-baw circles, at the foot and on the lower slopes of the Pegu Yomas, silkworms are bred by the Yabaings as in **PROME DISTRICT**. The annual produce of silk is about 9000 lbs., the value of which on the spot is £450. The quantity exported, chiefly to Prome and Shwe-daung, where, on account of the number of skilled weavers, there is the best market for it, is estimated at two-thirds of the total produce, or about 6000 lbs.

Of made roads there are 55 miles in the District, but cart travelling is easy in the plains, and along the left bank of the Sit-taung river a fairly good road leads to Bi lin *via* Sit-taung, Kyauk-to, and Kin-ywa. King Tabin Shwe-ti, who reigned over the Talaing kingdom from 1540 to 1550, made a road from Pegu to Taung-ngu with rest-houses and gardens at intervals for the use of travellers. This road still exists, but is passable in dry weather only. During the rains, communication is carried on almost everywhere by boat, the total length of waterway is 250 miles. The journey from Maulmain to the Sit-taung is made *via* Win-ba-daw on the west, and the Shwe-le Canal on the east, which is connected with the Bi lin river. To facilitate intercourse with Rangoon, an artificial canal has been cut from Myit-kyo on the Sit-taung to the Ka-ya-shu creek, and thence by the Paing-kyun channel into the Pegu river.

Administration.—In 1857-58, the total revenue of Shwe-gyin District amounted to £29,200. At the end of 1865-66, the whole of the Martaban Sub-division was transferred to Amherst District. In 1881-82, the imperial income of the District was £41,995, and

local funds yielded £5141, making altogether a gross revenue of £47,136, of which the land and capitation taxes and the fisheries form the chief items. For administrative purposes the District is divided into 4 townships, viz. Sit-taung, Bi-lin, Kyauk-gyi, and Shwe-gyin. These comprise 26 revenue circles, each of which is in charge of a *thugyi*, under the Deputy Commissioner or his subordinates.

For some years after British annexation, the country continued in a disturbed state. Whilst Min-laung was in rebellion in Yun-za-lin, a Shan prisoner, formerly a *thugyi*, effected his escape, and openly proclaimed himself on the side of Min-laung. The native officer in charge was murdered in cold blood, but a small detachment was immediately sent against the rebels, who were quickly dispersed. A strong police force was then constituted, which in 1881 consisted of 356 officers and men, giving 1 man to every 16 square miles and every 480 of the population. The total cost was £7505. The number of prisoners confined in the small lock-up at Shwe-gyin town was 57 in 1881. Besides the ordinary jail service, they are employed in oil and rice-cleaning mills.

The State middle-class school in 1881 had an average daily attendance of 62 pupils, all studying English. The American Baptist missionaries have also boys' and girls' schools for the Karens. But with these exceptions, the education of the people is entirely in the hands of the Buddhist monks and of a few laymen, who have opened village schools for instruction in reading and writing. The Census of 1881 returned 8743 boys and 666 girls as under instruction, besides 23,838 males and 5551 females able to read and write but not under instruction.

Climate.—Except in the hills, the climate is generally healthy. The heat is excessive from March till May; but a refreshing breeze blows from six to seven P.M. In 1883–84, the highest reading of the thermometer in the shade in May was 101° F.; the lowest reading in December was 56° F. Towards the end of May, the rains are ushered in by violent thunderstorms. The average annual rainfall for thirteen years ending 1881 was 144·5 inches. In 1883 the rainfall was 139·7 inches. The prevalent disease is fever. Number of patients treated at the dispensary (1883), 9881, of whom 289 were in-patients. In 1883, 4611 births and 2647 deaths were registered. [For further particulars regarding Shwe-gyin District, see the *British Burma Gazetteer*, compiled by authority (Government Press, Rangoon, 1879), vol. ii. pp. 643–662. Also the *British Burma Census Report* for 1881, and the several annual Administration and Departmental Reports of the Government of Burma.]

Shwe-gyin.—Township in the centre of Shwe-gyin District, Tenasserim Division, Lower Burma; lying on both sides of the Sit taung

river. Bounded north by Taung-ngu District, east by the Paung-laung range, south by Pegu, and west by Tharawadi and Prome Districts. The eastern and western borders are mountainous, and covered with dense forest, but between the lower slopes of the hills and the Sit-taung lie fertile tracts of rice land. The other principal rivers are the Kyu and the Da-la-nun on the east, and the Shwe-gyin on the west. Most of these are navigable for some distance during the rains. In the west, the township is traversed by numerous fair-weather cart-tracks; and the Sit-taung Valley (State) Railway also runs through it. The town of Shwe-gyin lies within this township, but it is not under the charge of the Extra-Assistant Commissioner. Chief villages—Pú-zun-myaung, the seat of a large manufacture of earthen pots, and Nyaung-le-bin. Population (1881) 58,255; gross revenue, £10,691.

Shwe-gyin.—Chief town and head-quarters of Shwe-gyin District, Tenasserim Division, Lower Burma; situated in lat. $17^{\circ} 55' N.$, and long. $96^{\circ} 57' 30'' E.$, on the left bank of the Sit-taung river, at the confluence of the Shwe-gyin river. Population (1881) 7519, namely, Hindus, 283; Muhammadans, 427; Christians, 124; Buddhists, 6684; and 'others,' 1. Extending across the angle formed by the junction of the two rivers is a low line of latente hills, on which stand the barracks of the small garrison, and a few houses, the remnant of the large cantonment established here after the second Anglo-Burmese war. Where these abut on the Sit-taung, north of the town, is the old fort and stockade, which the Burmese evacuated on hearing of the advance of the British column from Martaban to Taung-ngu in 1853. The main portion of the town, which is built regularly, lies in the low land between the Sit-taung and the Shwe-gyin, and during the rains is to a great extent flooded. The inhabitants are principally engaged in trade. The town contains the usual offices of a Deputy Commissioner, police station, post and telegraph offices, hospital and dispensary, school, and forest office for the examination of timber floated down the Sit-taung. Shwe-gyin is a place of modern growth.

Shwe-gyin.—River in Shwe-gyin District, Tenasserim Division, Lower Burma. It rises in the high mountains north-east of Shwe-gyin, and falls into the Sit-taung at that town. Above Shwe-gyin, where it receives the Ma-da-ma from the south, and where its channel suddenly deepens, the river is only navigable by the smallest boats. Its bed is sandy, and in places rocky.

Shwe-laung.—Township in Thun-gwa District, Pegu Division, Lower Burma; extending northwards from the sea-coast for nearly 100 miles, between the Pja-ma-law and the Irawadi rivers. Area, about 1150 square miles. In the north, the country consists of a plain covered with scrub forest; the lower portion is cut up into islands by numerous inter-communicating creeks, and is dotted with temporary

fishing hamlets. Shwe-laung comprises 6 revenue circles. Population (1881) 46,716; gross revenue, £19,203.

Shwe-laung.—Head-quarters of Shwe-laung township, Thun-gwa District, Lower Burma, and the seat of an Extra-Assistant Commissioner; situated in lat. $16^{\circ} 44' 30''$ N., and long. $95^{\circ} 23' 30''$ E., on the Irawadi.

Shwe-le.—River in Prome District, Pegu Division, Lower Burma; rising in the western slopes of the Ko-dek spur of the Pegu Yomas. It flows in a south-westerly direction, traversing the centre of the plain between the Yomas on the east and the Prome hills on the west, till it falls into the Myit-ma-ka, north of the village of Kin-than. This river is known by the names of Shwe-le, We-gyi, Wek-put, and Kyun-kyun-gya, in various portions of its course. During the rains, boats of 500 bushels burden can ascend the river as far as Tha-bye-paung-gyi village. The Shwe-le drains a rich teak country; and several attempts have been made to facilitate the removal of the felled logs to the Irawadi, but without success. This is owing to the numerous hill torrents that rush into the Shwe-le during the rains, and bring with them the forest debris, which during the dry season has rolled into their beds. Thus obstructions are formed; and the foaming water in a few hours bursts the banks, and either continues its course onward in the old channel, or cuts for itself a new one in the soft soil of the plain.

Shwe-le.—Township in Prome District, Pegu Division, Lower Burma; extending along the western slopes of the Pegu Yomas from lat. $18^{\circ} 28'$ to $18^{\circ} 51'$ N., and from long. $95^{\circ} 30'$ to $95^{\circ} 58'$ E. It includes the old townships of Shwe-le, Ywa-bein, and Myodaung, and is divided into 12 revenue circles. The whole country, except in the south-west, is hilly and covered with valuable timber. The other chief products are rice, cotton, and mulberry. The principal streams are the North and South Na-win and the Tin-gyi, but all are unnavigable within this township. Population (1881) 32,301; gross revenue, £3804.

Shwe-maw-daw.—Pagoda in the old fortified town of Pegu, Rangoon District, Lower Burma. It is a pyramidal, solid brick building, rising to a height of 324 feet from an octagonal base, each side of which is 162 feet long. It stands upon two terraces, the lower one being a parallelogram, with its sides 1390 feet long. The pagoda is surrounded by two tiers of smaller temples; the lower tier contains 75, and the upper 53.

The Shwe-maw-daw, in common with most of the sacred edifices in Burma, is connected with a legendary visit of Gautama. Tradition asserts that whilst Gautama was staying on the Mat-kula Hill, near the sources of the Yun-zalin river, he was visited by the two brothers Ma ha tha la and Tsu la tha la of Zaung-du, a village about 20 miles above the modern town of Pegu. To them Gautama gave two hairs;

and, foreseeing that in the 1116th year of his religion the capital of a powerful kingdom would be founded at Han-tha-wad-dī, he directed that these sacred relics should be enshrined on a hill close by Ma-ha-tha-la; and Tsu-la-tha-la obtained the aid of the Thagya king of their native town in carrying out Gautama's instructions. The King of Zaung-du placed certain *ndts* or spirits to guard the shrine, made grants of money and land to the pagoda, and dedicated a number of people to its service.

The Burmese chronicle is very vague and fragmentary, until it comes to what may be called the historical period. In the year 1116 of Gautama's era (573 A.D.), Tha-ma-la and Wi-ma-la established the kingdom and city of Han-tha-wad-dī, of which Tha-ma-la was the first sovereign. Finding the Shwe-maw-daw still in existence, he added to it and dedicated 25 families to its service. Successive sovereigns kept the pagoda in repair. In 1209 A.D., A-nū-ma-ra-za, the twelfth king of the original dynasty, obtained a holy tooth from the King of Tha-tun to enshrine in this pagoda; and Dham-ma-ze-di, who came to the throne in 1502, received from the King of Ceylon a present of 100,000 paving-stones, of which 50,000 were used in paving the court or upper terrace. Towards the end of the 18th century, on the occasion of a visit from the King of Burma, the pagoda was thoroughly repaired, and the *ti* or umbrella canopy re-gilt. In June 1852, on the outbreak of the second Anglo-Burmese war, the Shwe-maw-daw was the scene of some sharp fighting previous to the capture of the town of Pegu by the British.

Shwe-myin-din.—Pagoda in the Ka-ma township of Thayet-myo District, Pegu Division, Lower Burma. Its name, which means 'conspicuous,' is derived from its position. It is said to date from about 100 A.D.; and subsequently, as it was found that the desires of many who visited this shrine were accomplished, it received its second name of Shwe-tsu-taung-byi, or 'prayers fulfilled.'

Shwe-nat-taung.—Pagoda in Prome District, Pegu Division, Lower Burma; about 16 miles south of Prome town. It is said to have been erected by San-da-de-wī, the queen of Dut-ta-baung, the founder of Prome (circa 442 A.C.). The building has been since added to and repaired, and being profusely gilt, stands out conspicuously on a low hill. Behind it are six other pagodas. The annual festival held in March is attended by about 20,000 people.

Shwe-nyaung-bin.—River in Bassein District, Pegu Division, Lower Burma. Falls into the Bassein river in lat. 17° 1' N., and long. 94° 55' E., and communicates with the Da ga by several creeks. It is from 100 to 150 feet wide in its lower portion, but navigable by large boats only during the rains.

Shwe-san-daw.—Pagoda near Tuan-te in Rangoon District, Pegu

Division, Lower Burma; more venerated by the Talaings than even the great Shwe-Dagon of Rangoon. According to its sacred history, it was erected in 577 B.C. by Thamein-taw-byin-yan, the King of Ka-bin, and his queen, as a shrine for three of Gautama's hairs given to him by three pilgrims from Ceylon, on the occasion of their visiting him whilst he was tarrying in the Zin-gyaik Hills. Subsequently, in 538 A.C., four more holy hairs were deposited in the pagoda by King Thamein-taw-byin-gnya-kan-de and a hermit named Gyi-ri-ren-ga. Near the Shwe-san-daw is a grove of *thwt-ta-bat* trees (*Sapota* sp.), seven in number, the only ones in Pegu. The trees were cut down, it is said, by order of the Talaing rulers, when the Burmese conquered their country, because the produce was a royal fruit to be eaten by none but the monarch, and the present trees are shoots of the old stumps.

Shwe-san-daw.—Pagoda in Prome town, Prome District, Pegu Division, Lower Burma. It is situated on a hill about half a mile from the bank of the Irawadi, and gives its name to a quarter of the town. The building is gilt all over, and is solid. Its height is 180 feet, and it occupies an area of 11,025 square feet. It is surrounded by 83 small gilt niches, called *Ze-di-yan*, each containing an image of Gautama. The pagoda stands on a paved platform, approached by four flights of steps, two of which, the northern and the western, are covered with elaborately carved roofs supported on massive teak posts. The gilt iron network *ti*, or conical top, is 10 feet in diameter at its base. There are on the platform 12 or 13 bells attached to massive cross-bars, which are struck with deers' antlers by those who come to worship.

This pagoda is supposed to have been first erected by two brothers, *I-zi-ka* and *Pa-li-ka*. Tradition alleges that when Gautama arrived near Prome, and was walking on the island of *Zin-yan*, he was accosted by a *naga* or dragon, who begged for some sacred hairs to enshrine in a temple. Gautama refused this request, saying that the glory of building a pagoda to contain his relics must be reserved for two brothers who had gone on a trading expedition to *Thu-wun-na-bhu-mi* or *Tha-htun*. The *naga* then presented to Gautama an emerald box, praying that as he could not receive the sacred hairs, he might at least contribute the receptacle for them. His gift was accepted, and shortly afterwards *I-zi-ka* and *Pa-li-ka* anchored at a place known to this day as *Mya-ywa* or 'Emerald Village,' and discovered the relics. Having heard of Gautama's prediction, that on the site of the modern Prome the capital of a powerful kingdom would be founded, they proceeded thither, and after considerable difficulty built the pagoda on the hill on which it now stands. Seven days after their departure for their native place, the pagoda sank into the earth. Owing to the prayers of King *Dut-ta-haung*, the founder of ancient Prome, the pagoda reappeared, and the king restored it.

The Burmese records give no further account of the building, and oral tradition is all we have to rely upon. In 1753, Alaung-payá coated it with gold, and in 1841, King Tharawadi thoroughly repaired the pagoda, which had been damaged by an earthquake, and put on it a new *ti* studded with jewels. Since then it has been again partially destroyed by another earthquake. It has lately been re-gilt, at an estimated cost of about £2500, raised by public subscription. The annual festival is held on the full moon of Tabaung, corresponding to March.

Shwe-thek-lut (lit. '*Golden Life Preserved*').—Pagoda in Thayet-myo town, Thayet-myo District, Pegu Division, Lower Burma. It was erected by Min-gyi-swa-saw-ke, the second king of the Ava dynasty, about 1373 A.D., as a thankoffering for the preservation of his life when he, as a child, was taken captive in Thayet-myo by the King of Arakan. This building is remarkable as being one of the most southern hollow pagodas; in Upper Burma there are many of this kind, but in the lower country the great majority are of the solid bell-shaped pattern.

Shwe-tsu-taung-byí.—Pagoda in Thayet-myo District, Pegu Division, Lower Burma.—See SHWE-MYIN-DIN.

Shwe-tsway-daw.—Pagoda in Thayet-myo District, Pegu Division, Lower Burma.—See SHWE AN-DAW.

Siáldah.—Village in the Twenty-four Parganas District, Bengal; situated just outside the limits of Calcutta. Lat. $22^{\circ} 35' N.$, long. $88^{\circ} 26' E.$ Terminus of the Eastern Bengal and Calcutta and South-Eastern Railways. Seat of a large transit trade.

Siálkot (*Sealkote*).—British District in the Lieutenant-Governorship of the Punjab, lying between $31^{\circ} 44'$ and $32^{\circ} 50' N.$ lat., and between $74^{\circ} 12'$ and $75^{\circ} 3' E.$ long. Area, 1958 square miles; population (1881) 1,012,148 souls. Siálkot forms the north-western District of the Amritsar (Umritsur) Division. It is bounded on the north-west by the river Chenáb and its tributary the Távi, which separate it from Gujráť District; on the north-east by the Januí Province of Kashmír State; on the east by Gurdáspur District; on the south-east by the Rávi, which separates it from Amritsar and Gurdáspur Districts; and on the west by Gujránwála and Lahore Districts. It is an oblong tract of country, occupying the submontane portion of the Reçhna or Rávi-Chenáb *dohb*; having a length from north-west to south east of a little over 50 miles, with an average breadth of 44 miles. Siálkot stands twenty-fourth in order of area, and second in order of population among the thirty-two British Districts of the Punjab, and comprises 1.84 per cent. of the total area, and 5.39 per cent. of the total population of the Province. The administrative head-quarters are at the town of SIALKOT.

Physical Aspects.—The District of Siálkot, occupying the upperme

portion of the Rechna Doáb, stretches in a comparatively unbroken level from the valley of the Rávi on the south-east, to that of the Chenáb on the north-western border. Along the coast of either great boundary river, a narrow fringe of alluvial lowland marks the central depression in which they run; while above them rise the high banks which form the limits of their wider beds. Parallel to the Rávi, another stream, the Degh, which rises in the Jamú (Jummoo) Hills, traverses the south-eastern corner of the District, fringed on either side, like the greater rivers, by a strip of alluvial soil. The remainder of the surface consists of a level plain, slightly submontane in character, lying at a distance of 20 miles from the outermost range of the Himálayan system. Midway between the Rávi and the Chenáb, however, a high dorsal tract stretches from beyond the Jamú border far into the heart of the Doáb. Spreading in its northern portion from the valley of the Degh to the high bank of the Chenáb, it narrows gradually as it runs south-westward, till it finally terminates in an apex about 10 miles beyond Pasrúr, thus forming an irregularly triangular wedge.

The neighbourhood of the hills has imparted to the general aspect of the District a greenness and fertility rare among the Punjab plains. More than two-thirds of its area have already been brought under the plough; and of the remainder, perhaps a third more is capable of being brought under cultivation by careful tillage. The upper portion of the District, especially close to the hills, produces excellent crops; but the southern portion, farther removed from the influence of the rains, shows a marked decrease of fertility. The poorest lands lie in the triangular dorsal ridge, where the naturally arid soil depends entirely for its water-supply upon the local rainfall. Elsewhere, irrigation from wells or hill streams has turned the whole country into a waving sheet of crops. The alluvial lowlands of the Chenáb and the Degh, however, suffer in parts from the injurious saline efflorescence known as *reh*. Between the Degh and the Rávi, too, the wild and unproductive upland grows more and more impregnated with saltpetre as it recedes from the hills, till near the Lahore border it merges into a tangled jungle of brushwood and reeds.

Numerous small torrents traverse the north-eastern tract. Several swamps (*jills*) studded over the face of the country are useful for irrigation, and many of them have had their capacity considerably increased by artificial embankments, in which cases the water is made available by means of ducts. The two largest marshes are those of Satrah and Manjke. The first is artificial, and covers an area of 450 acres, supplying water to 12 villages. The Manjke marsh is 687 acres in area, with a depth in parts of 8 feet, and also irrigating 12 villages. The Daskali and Lunki marshes, formerly very large, have been recently drained. They do not now retain water, and almost the whole of their area has

been brought under the plough. Some of the minor marshes are mere swamps, the beds of which are to a great extent cultivated with rice as the water dries up in the winter months. Traces of ancient canals may still be observed, some of which might repay the trouble of restoration. The most remarkable owed its origin to Ali Mardān Khān, the famous engineer of Shāh Jahān, and once brought the waters of the Távi to supply the imperial gardens at Shāhdara.

There is nothing approaching the description of a forest, or even of a good-sized wood, in the District; old trees are rare. The trees commonly found in the low-lying country are of recent growth, occurring here and there singly or in clumps around villages and wells. Much has been done of late years in planting trees along the public roads. The people also are beginning to take interest in arboriculture, and orchards and gardens are springing up all over the District.

The mineral products are few and unimportant. Beds of *kankar* (limestone nodules) of good quality occur in abundance along the high bank of the Chenāb, 3 miles north of Siálkot cantonment, and at Marākiwal, Godhpūr, and Ballanwāla, the latter a mile west from the cantonment. At the same localities limestone is found; but lime of a better quality is obtained from the boulders of certain streams or from the banks of the Távi, below Jamú. The marsh at Satrah is famous for yielding a clay called *wani*, which is used for pottery, and is valued for its property of receiving a colour when baked. Good pottery clays are also procured on the Lúndā *nallā* above Pasrūr. Saltpetre is found in the earth of old village sites (*tibbā*), but the manufacture is extremely limited.

A few wolves are the only representatives of the carnivora in the District, while even deer and hares find little cover in so highly cultivated a tract. A few wild hogs and antelope are found. Wild geese, ducks, and water-fowl are abundant in the cold weather in the marshes and upon the river banks and islands. Quail abound, partridges are scarce.

History.—Rasālu, Rájá of Siálkot, who lived somewhere about the first century after Christ, forms the great centre of all the local legends. General Cunningham identifies this possibly mythical hero with the son of Sálivahāna, the Vikramāditya who overthrew the Sakas about 78 A.D. Tradition universally points to the town of Siálkot as the Rájá's capital, while a thousand stories keep alive his memory among the Hindus of the hills and the submontane tract. After Rasālu's death, however, his kingdom fell under a curse, and remained desolate for three hundred years.

About 643 A.D., the Rájput princes of Jamú overran the District, which they held until its union with the Muhammadan Empire. For

while the Hindu rulers managed to retain their possessions in the plains by the payment of a tribute to the Delhi Emperors; but under the Mughals, Siálkot formed part of the Province (*subah*) of Lahore, and did not revert to its ancient princes until after the dissolution of the Mughal organization in the days of Ahmad Sháh Duráni. During that stormy period, however, the Rájput Rájás of Jamú once more made good their claim to the fertile and level belt which stretched at the foot of their mountainous principality. In 1740, Ranjít Deo, the ruling Rájá, under a grant from the Duráni Emperor, possessed himself, by force of arms, of a strip of territory stretching from Dinga in the Jetch Doáb to the valley of the Rávi. A powerful Pathán family then occupied the town of Siálkot itself; while the remainder of the District was harried by bands of Sikhs, under the command of the Bhangi chieftains and of Charrat Singh, grandfather of Ranjít Singh, the Mahá-rájá of the Punjab. In 1774, Brij Ráj Deo, son of the Jamú Rájá, rebelled against his father, and called in the aid of Charrat Singh. The Sikh chieftain gladly embraced the opportunity; but Ranjít Deo met him on the banks of the river Basantar, as he marched on Jamú, and utterly defeated the Sikh forces, while Charrat Singh himself lost his life in the engagement. The Bhangi chieftains, who had just wrested Siálkot town from its Pathán masters, and dreaded the rising power of their co-religionist, gave their aid to the Rájá in this campaign. Mahá Singh, son and successor of the defeated chief, then turned southward, and began to establish his authority in the lower part of the Doáb.

Meanwhile, Ranjít Deo died in 1783, and was succeeded by his rebellious son, Brij Ráj Deo, a man of debauched habits, quite unfit to hold his own against the active and vigorous Sikhs. Mahá Singh seized upon the opportunity, and advanced upon Jamú in 1784 with a considerable force. The new Rájá fled to the hills on his approach, and Mahá Singh sacked the defenceless capital without striking a blow. He did not attempt, however, to secure his conquest, but retired at once to his head-quarters at Gujránwála. The Bhangi chiefs of Siálkot and the Kanhyas from the Bári Doáb thereupon completed the overthrow of the Jamú prince, and wrested from him, by 1786, all his father's acquisitions in the plains. Brij Ráj Deo himself finally fell in battle, making a last effort to resist the Sikh encroachments. The whole District thus passed into the hands of the rising sect, and the greater part became the appanage of retainers of the Bhangi confederacy or *misl*. The Kanhya chiefs took the rest, except a few villages which fell to Mahá Singh.

But Ranjít Singh, son of the last-named prince, soon disturbed this amicable arrangement of territory in the Rechna Doáb. In 1790, the future Mahárájá appropriated part of the Bhangi domains; and in 1807 he made himself master of Pasrúr. In the same year, the Sardárs of

Siálkot ventured to question his title to these new acquisitions; whereupon Ranjit Singh promptly attacked and defeated them, adding Siálkot to his growing dominions. By the end of 1810 the whole District had been swallowed up; while, a few years later, the Mahárájá made himself supreme from the Sutlej (Satlaj) to the Suláimán Mountains.

British rule was extended to Siálkot in 1849, after the second Sikh war. On the first distribution of the Province into Divisions and Districts, the whole upper portion of the Rechna Doáb was formed into a single charge, having its head-quarters at Wazirábád. In 1850, however, this extensive District underwent sub-division, being formed into the two new Districts of Gujránwála and Siálkot, while portions were made over to Gurdáspur and Lahore. Subsequent transfers of territory have brought the boundaries to their present shape.

During the Mutiny of 1857, Siálkot was the scene of an outbreak of the native troops stationed in the cantonments, who murdered the Brigadier commanding the station, besides other British officers, and the chaplain, with his wife and child. The mutineers laid siege to the European residents in the fort, and remained masters of the whole District for a short time. The treasury was plundered, and all the records destroyed, the prisoners in jail were released, and the houses of the residents were looted by the mutineers, aided by the bad characters from jail, and by the police and the inhabitants of the neighbouring villages. The District, however, was soon recovered. The ringleaders, including the two principal native officers of police, and the jail overseer, were summarily executed; and soon afterwards 141 of the rebellious sepoys, who had taken refuge within Kashmír territory, were handed over by the Mahárájá's officers, tried by court martial, and most of them hanged at Gurdáspur and Siálkot.

Population.—The area at present included in Siálkot District had a population of 805,837 at the Census of 1855. By 1868 the number had increased to 1,004,695, showing an increase of 198,858, or 24·7 per cent. At the last Census in 1881, the population of Siálkot was returned at 1,012,148, showing a further slight increase of 7453, or less than 1 per cent., in thirteen years. Siálkot ranks third in point of density among the Punjab Districts, being only exceeded in this respect by Jálándhar and Amritsar. The slight increase is due to the fact that the emigration to other Districts in the Punjab greatly exceeds the immigration. Indeed, were it not for the large influx of fugitives from the Kashmír famine in 1878–80, who constitute more than three-fourths of the immigrants, the Census of 1881 would have shown an actual decrease of population, the emigration having more than counterbalanced the natural increase of births over deaths.

The results of the Census of 1881 may be summarized as follows:—Area of District, 1958 square miles, with 9 towns and 2303 villages;

number of houses, 143,205, namely, occupied 114,262, and unoccupied 28,943; number of families, 224,052. Total population, 1,012,148, namely, males 539,661, and females 472,487; proportion of males, 53·3 per cent. Average density of population, 517 persons per square mile; towns or villages per square mile, 1·18; houses per square mile, 73; persons per village, 438; persons per house, 8·8. Classified according to sex and age, there were in 1881—below 15 years, males 217,883, and females 186,633; total children, 404,516, or 40 per cent. of the whole population: 15 years and upwards, males 321,778, and females 285,854; total, 607,632, or 60 per cent. of the whole population.

Religion.—As regards religious distinctions, the Muhammadans form the great bulk of the population, and in 1881 numbered 669,712, or 66·16 per cent. of the total. Hindus numbered 299,311, or 29·57 per cent.; Sikhs, 40,195, or 4 per cent.; Jains, 1388; Christians, 1535; and Pársís, 7. The principal Muhammadan tribes include—Sayyids, 12,849; Shaikhs, 11,636; Patháns, 4118; Mughals, 4537; Kashmírs, 19,153; and Khojahs, 5550. These are the Muhammadans by race descent, as apart from the descendants of converts from Hindu castes. The Játis, the most numerous tribe in the District, who form the great bulk of the agricultural class, number 266,040, of whom 170,878 are Muhammadans, 95,147 Hindus and Sikhs, and 15 of other religions. The Rájputs number 57,269, consisting of 45,534 Muhammadans and 11,735 Hindus and Sikhs. The Awáns, the leading race of the submontane tract, are a tribe of great social and political importance, 19,753 in number, and exclusively Muhammadans. Aráins, 65,241, and Gújárs, 11,642, are almost exclusively Muhammadans. Of the Chuhars, 78,980 in number, 19,617 are Hindus and Sikhs; Tarkháns, 41,781, include 9290 Hindus or Sikhs; and Kumbhárs, 29,713, include 10,304 Hindus and Sikhs. The following are the other principal classes met with in the District, mainly Muhammadans, but nearly all of them with a greater or lesser Hindu and Sikh element—Jhinwárs, 35,314; Megs, 28,705; Náis, 20,569; Lohárs, 18,584; Barwálas, 16,901; Mochís, 15,003; Dhobís, 13,988; Telís, 13,652; Batwáls, 13,190; Mirásís, 12,921; Sonárs, 8947 (chiefly Hindus); Chamárs, 8076; Changars, 7139; Labáns, 6584; Fakírs, 6156; and Bhatíás, 5784. The purely Hindu castes are—Bráhmans, 36,100; Khattrís, 18,440; Aroras, 15,793; and Baniyás, 10,795.

The Christian population consists of—Europeans, 1264; Eurasians, 18; and Natives, 253: thus classified according to sect—Church of England, 923; Román Catholic, 300; Church of Scotland, 144; Protestants, undistinguished by sect, 64; American Church, 20; Methodists, 13; unspecified and others, 71. The American Presbyterian Mission have had a station at Siálkot since 1855, and the Church

of Scotland since 1857. The Rev. T. Hunter, the first Scotch missionary, was murdered, together with his wife and child, by the mutineers a few months after the establishment of the Mission, and a handsome church has been erected at Sialkot in his memory.

Urban and Rural Population.—The District contains three towns with upwards of five thousand inhabitants, namely, SIALKOT TOWN (1881), 45,762; PASRUR, 8378; and DASKAH, 5525. Six other towns, with less than five thousand inhabitants, are also municipalities, namely, ZAFARWAL, 4978; NAROWAL, 4558; KILA SOBHA SINGH, 4521; JAMKI, 4157; MITRANWALI, 3730; and SANKHATRA, 2381. The total urban population thus disclosed amounts to 83,990, or 8·3 per cent. of the District population, leaving 928,158, or 91·7 per cent., for the rural population. The total municipal income of the nine towns above mentioned amounted in 1883-84 to £6981, or an average of 1s. 7½d. per head of the municipal population. Of the 2312 towns and villages in the District, 806 contain less than two hundred inhabitants; 957 between two and five hundred; 373 between five hundred and a thousand; 142 between one and two thousand; 19 between two and three thousand; 12 between three and five thousand; 2 between five and ten thousand; and 1 between twenty and fifty thousand inhabitants.

As regards occupation, the Census of 1881 returned the adult male population under the following seven classes:—(1) Professional class, including all Government servants, civil and military, 16,692; (2) domestic and menial class, 24,318; (3) commercial class, including merchants, traders, carriers, etc., 5730; (4) agricultural and pastoral class, including gardeners, 152,932; (5) industrial and manufacturing class, 83,916; (6) indefinite and non-productive class, including labourers, 23,921; and (7) unspecified, 14,269.

The houses are built either of mud or of baked brick. An ordinary village is a mere collection of flat-roofed mud huts separated by narrow alleys, plastered over with a mixture of earth, chopped straw, and cow-dung; surrounded outside by rows of cow-dung (used for fuel), stacks of straw, sheds for weavers, goat pens, places for meeting, and temples for worship, huddled together in disorderly array; while every yard of available space is filled up with heaps of village refuse required for manure. Only in the larger and wealthier villages may be seen a few brick houses. Each family lives in a separate courtyard; but here all pretence of privacy is at an end. Cattle and their owners consort together, and may even be seen herding in the same apartment, while a total disregard of order or cleanliness prevails. Where there are two or three different castes in the same village, they are usually grouped into separate quarters.

Except among the upper classes, there does not seem to be much fondness for dress. A *lungafi* of white or blue cloth round the loins, a

scarf over the shoulder, a turban (*Agri*) of limited dimensions, and a pair of shoes, compose the clothing of the great majority of the people, except on high days and holidays. The Rājputs are very partial to earrings, and to English chutzes for jackets. In tracts where thorny brushwood abounds, yellow leather trousers are worn. The Hindu Jāts sometimes wear short baggy trousers. Women are given to wearing coarse jewellery and nose-rings; and a small looking glass, attached to a ring on the finger, is part of the adornment. Nearly all the cloth is made in the village by a race of weavers maintained for the purpose; the spinning, the early manipulation, and subsequent ornamentation being the work of the females of the family.

The food of the people consists chiefly of grain and vegetables; meat is a luxury which few can afford, except on days of rejoicings, when a sheep or goat is killed and distributed. Fish is seldom eaten, even by those residing near rivers. During the spring, barley, *karṇāṭ*, *ṣaṇṇāṭ*, and *Adra* form the staples of diet; during the autumn and winter, wheat and rice. The grain, done up into a dry cake and baked, is eaten with lime or mango pickle, or with clarified butter and salt, or with a few chillies or onions and salt. To make it more palatable, a wash of vetches or country pea, called *saṇṇāṭ*, is sometimes added. The favourite drink is *lassi*, or buttermilk. Intoxicating liquors are not much drunk, though some Jāts have a habit of taking a decoction of poppies. Two meals are ordinarily taken in the day, morning and evening; but day-labourers engaged in hard manual labour indulge in a mid-day meal, when able to afford it.

Cultivation.—Out of a total area of 1958½ square miles, or 1,253,559 acres, as much as 902,990 acres were under cultivation in 1883-84. Of the remainder, 22,815 acres were returned as grazing lands, 124,119 acres as cultivable, and 203,629 acres as uncultivable waste. The area under each crop in 1883-84 (including lands bearing two harvests in the year) was as follows:—*Kaṭi* or spring harvest, 600,039 acres, namely, wheat, 374,301 acres; barley, 101,000; gram, 18,281; pulses, 35,083; tobacco, 6000; oil seeds, 13,496; spices and drugs, 1060; vegetables, 5144; and other crops, 45,720 acres. *Harif* or autumn harvest, 330,179 acres, namely, rice, 07,913 acres; Indian corn, 01,880; millets, 03,031; pulses, 21,375; oil seeds, 11,405; sugarcane, 18,614; cotton, 38,374; vegetables, 3120; and other crops, 14,355 acres. Wheat forms the great staple of the *raṭi*, and rice and millets of the *Harif*. The best sugarcane grows on the land watered by the Dab, and in the lowlands of the Chenab north of Salkot town. Millets, on the other hand, occupy the dry uplands in the centre of the District. Irrigation is widely practised, as much as 530,731 acres (or nearly two-thirds of the total cultivated area) being artificially supplied with water, according to the latest returns. In the tract known as the

Bajwāt, nearly every field derives an abundant supply from a network of cuts and watercourses in connection with the Chenāb and its branches. Elsewhere, irrigation is carried on from wells, or by means of Persian wheels working upon the banks of streams. The value of manure is universally appreciated, and rotation of crops is carried out to a considerable extent.

The agricultural stock of the District in 1883-84 was returned as follows:—Cows and bullocks, 233,556; horses, 3252; ponies, 1231; donkeys, 6114; sheep and goats, 44,792; pigs, 521; camels, 98; ploughs, 98,395. The indigenous supply of cattle is insufficient to meet the local demand, and large numbers are bought at the cattle fairs in Amritsar, or are imported from other Districts. An annual cattle fair is held at Siālkot in September, lasting for a week, at which from 8000 to 10,000 head of cattle, chiefly buffaloes, are exhibited. The attendance is estimated at about 70,000, and in 1883 the value of the cattle sold amounted to £15,000.

The village tenures belong as a rule to the intermediate type known as *pattidāri*. Rents are paid almost equally in kind and in money. Where money rents prevail, the following are the minimum and maximum rates, varying according to the quality of the land, and the caste or social status of the tenant —Rice lands, from 10s. to £2, 18s. an acre; wheat (irrigated), from 5s. 4d. to £2 an acre, wheat (unirrigated), from 3s. 2d. to £1, 5s. 10d. an acre; cotton, from 3s. to £1, 5s. an acre; sugar-cane, from 5s. to £3, 8s. 6d. an acre; and tobacco, from 9s. 4d. to £4, 10s. an acre. Day-labourers are seldom employed upon agricultural work except at harvest-time, when they receive their wages in grain. Skilled labourers in towns now receive from 8d. to 10d. per diem; unskilled, from 3d. to 4½d. per diem. Prices of food-grains ruled as follows on the 1st of January 1884:—Wheat, 24 *seers* per rupee, or 4s. 8d. per cwt.; barley, 39 *seers* per rupee, or 2s. 11d. per cwt.; gram and *bdjra*, 33½ *seers* per rupee, or 3s. 4½d. per cwt.; Indian corn, 32 *seers* per rupee, or 3s. 6d. per cwt.; *jowar*, 36 *seers* per rupee, or 3s. 1d. per cwt.; rice, 13 *seers* per rupee, or 8s. 7d. per cwt.

Commerce and Trade, etc.—The local commerce centres in the town of Siālkot, which gathers into its *bāzārs* more than half the raw produce of the District. The large markets of Lahore and Amritsar (Umritsur) afford a ready outlet for its surplus stocks, while the great rivers on either side form natural channels of communication with the lower parts of the Punjab. Grain of all kinds is exported to Multān, Lahore, and Amritsar; sugar and molasses to Peshāwar, Kābul, and Karāchi (Kurrachee). The famous *koffgāri* or damascene work manufactured at Koth, a large village six miles from Siālkot, is carried for sale by the artisans themselves to all parts of India. Shawl-edging, manufactured by Kashmiri settlers at Siālkot

and Kilá Sobha Singh, is sent to Amritsar; and country cloth to the hill tracts. The import trade includes—grain from Batála and the Bári Doáb uplands; salt from Pind Dádan Khán; rice, tobacco, and potatoes from Kángra, Núrpur, Murree, and Dalhousie; *ghí* from Jakálpur and the hills; timber, spices, hides, fruits, valuable shawls, and woollen fabrics from Kashmír; hemp from the submontane tracts of Jamú; and indigo from Múltán.

The indigenous manufactures of the District comprise silk, saddlery, shawl-edging, coarse chintzes, pottery, brass vessels, country cloth, cutlery, *kostgári* ware, and paper. In 1869, an undertaking was started at Siálkot under the name of the Belfast Flax Company, to encourage the growth of flax for exportation to England; but though an excellent fibre was raised in the District, the difficulty of procuring good seed, and the apathy of the peasantry (who would not adopt the new methods necessary to the production of first-class flax), caused the enterprise to prove a failure after some years' trial.

Means of Communication.—The metalled road from Wazírábád to Siálkot, and thence on to Jamú in Kashmír territory, was the principal line of communication in the District before the railway was opened. It has a length of about 35 miles in the District. Other lines communicate with Gujránwála, Amritsar, Lahore, *via* Eminábád, Gurdáspur, and Dalhousie. Total length of District roads (1883-84), metalled 43 miles, and unmetalled 747 miles. A branch of the Punjab Northern State Railway from Wazírábád to Siálkot, a distance of 27 miles, was opened for traffic on the 1st January 1884. The Chenáb and Rávi rivers are navigable by ordinary flat-bottomed boats of from 250 to 400 *maunds* burden, according to the season of the year. Ferries are established at all the principal crossings.

Administration.—The District staff usually comprises a Deputy Commissioner, a Judicial Assistant, an Assistant Commissioner, and 3 Extra-Assistant Commissioners, besides a Cantonment Magistrate, the ordinary medical, fiscal, and constabulary officials. The total imperial revenue raised in the District in 1872-73 amounted to £125,768; of which sum £108,598, or more than five-sixths, was derived from the land. By 1883-84, the total imperial revenue had increased to £145,531, of which £111,712 was derived from the land. Besides these imperial receipts, a small provincial and local revenue is also raised. The total number of civil and revenue judges in 1883-84 was 21; and the total number of magistrates, 20. The regular police force in the same year numbered 377 officers and men, while the cantonment and the municipalities maintained a separate constabulary of 178 men. This force is supplemented by a body of 2525 village watchmen (*chaukidárs*). The total machinery, therefore, for the protection of person and property amounted to 3080 officers and men,

being 1 policeman to every 0·6 square miles of the area and to every 328 of the population. The jail at Siálkot contained in 1883 a total of 1428 prisoners, with a daily average of 345.

Education has made a considerable start since the introduction of British rule. In 1872-73, the District contained 427 schools of all grades (besides the normal school at Siálkot town), with a roll of 8491 pupils. The total expenditure on education during that year amounted to £3275. In 1883-84, the Government schools in Siálkot District consisted of a high school, 9 middle schools, 72 primary boys' schools, and 38 primary girls' schools, attended by a total of 5416 pupils, of whom 880 are girls. The above are exclusive of 4 missionary or church schools, a convent school for Europeans and Eurasians, a municipal school, and a school for vernacular teachers. It also excludes indigenous uninspected village schools, which were returned at 604 in 1882-83, with 6831 pupils. The Census Report of 1881 returned 9525 boys and 455 girls as under instruction, besides 19,988 males and 408 females able to read and write but not under instruction.

The District contains four printing presses,—one at the jail, and another at Hajipur belonging to the American Mission, which print in English, Urdu, Persian, and Hindi; and two native presses in Siálkot town, which print in the vernacular only. One of these publishes a vernacular newspaper, the *Rafa-i-Am*, which has a fair circulation.

Medical Aspects.—The climate of Siálkot may be considered as free from excessive heat, judged by the ordinary standard of the Punjab. Even in the hottest weather, a storm in the hills produces a pleasing change; while in May and September, cool breezes from the Himálayas moderate the prevailing heat. The mean monthly temperature for a period of fifteen years ending 1881 is returned as follows.—January, 51·5° F.; February, 56·5°; March, 65·3°; April, 76·7°; May, 84·9°; June, 90·5°; July, 63·8°; August, 84·9°; September, 83·1°, October, 74·5°; November, 61·8°; and December, 52·7°. Average annual mean, 72·4° F. In 1883, the thermometer in May ranged from a maximum of 113·8° to a minimum of 64·2°, with a mean of 89·6°; in July 1883, the maximum was 114·9°, minimum 68·5°, mean 91·3°; in December 1883, the maximum was 73·1°, minimum 34·1°, mean 54·7°. The average annual rainfall for twenty-four years ending 1881 was 37·83 inches, distributed as follows:—January to May, 7·94 inches; May to September, 27·83 inches; October to December, 2·06 inches. In 1883, the total rainfall amounted to 28·9 inches, or 8·9 inches below the average.

Siálkot bears a good reputation as a healthy tract. Malarial fever, small-pox, dysentery, and pneumonia are the prevalent diseases. The itch also proves troublesome amongst the agricultural classes. The

total number of deaths from all causes reported in 1883 was 28,686, or 28 per thousand. Of these no less than 16,021, or 15·8 per thousand, were assigned to fevers. The District contains 11 Government charitable dispensaries, which afforded relief in 1883 to 78,754 persons, of whom 987 were in-patients. The leper asylum at Pathán-wáli consists of three barracks, capable of accommodating about 100 lepers. Cattle disease occurs in the form of a murrain called *waba*, which carries off a large number of beasts every year. [For further information regarding Siálkot, see the *Gazetteer of Siálkot District*, compiled under the authority of the Punjab Government (Lahore, 1883-84). Also *Report on the Revised Settlement of Siálkot District*, 1850-1860, by E. A. Prinsep, Esq.; the *Punjab Census Report* for 1881; and the several annual Administration and Departmental Reports of the Punjab Government.]

Siálkot.—*Tahsil* of Siálkot District, Punjab; consisting of a fertile agricultural country, lying round the town of Siálkot. Area, 637 square miles; number of towns and villages, 794; houses, 44,195; families, 83,106. Population (1881) 402,825, namely, males 215,094, and females 187,731. Average density of population, 632 persons per square mile. Classified according to religion, Muhammadans number 257,341; Hindus, 129,039; Sikhs, 14,182; Jains, 876; Christians, 1380; and Pársis, 7. Of the 794 towns and villages in the *tahsil*, 595 contain less than five hundred inhabitants; 122 between five hundred and a thousand; 75 between one thousand and five thousand; 1 between five and ten thousand; and 1 between twenty and fifty thousand. The average area under cultivation for five years ending 1881-82 is returned at 290,658 acres; the principal crops being—wheat, 96,518 acres; barley, 60,752 acres; rice, 19,208 acres; Indian corn, 23,170 acres; *jodr*, 16,111 acres; gram, 5361 acres; other food-grains, 4050 acres; cotton, 17,882 acres; sugar-cane, 15,848 acres; vegetables, 3820 acres; tobacco, 1851 acres; and poppy, 142 acres. Revenue of the *tahsil*, £25,989. The administrative staff, including the head-quarters officers of the District, consists of a Deputy Commissioner, Judicial Assistant Commissioner, 3 Assistant or Extra-Assistant Commissioners, 1 Judge of Small Cause Court, 1 *tahsildár*, and 2 *munsifs*. These officers preside over 9 civil and 7 criminal courts; number of police circles, 4; strength of regular police, 131 men; village watch or rural police (*chaukidárs*), 525.

Siálkot.—Town, municipality, military cantonment, and administrative head-quarters of Siálkot District, Punjab; situated in lat. 32° 31' N., and long. 74° 36' E., on the northern bank of the Aik torrent, upon the edge of the high triangular ridge which extends southward from the Jamú Hills. Distant from Lahore 72 miles north-east.

The town was founded, according to tradition, by Rájá Sál or

Shāl, mentioned in the *Mahābhārata* as an uncle of the Pāndava princes. Restored about 65 or 70 A.D. by Śālwan or Śālivahāna, otherwise called Vikramāditya, father of the great Punjab hero, Rasālu, whose capital Śālkot is also stated to have been, and whose exploits form the subject of countless Punjab legends. Towards the end of his reign, Rasālu became involved in wars with a Rājā Hūdī, popularly stated to have been a Ghakkar chieftain. Being worsted in battle, Rasālu as the price of peace was forced to give his daughter in marriage to his conqueror, who, on Rasālu's death without heirs, is said to have succeeded to the rule of Śālkot. According to a further legend related to Mr. Prinsep—'After the death of Rājā Rasālu, the country is said to have fallen under the curse of Pūran (brother of Rasālu, who had become a *fakīr*) for 300 years, lying totally devastated from famine and incessant plunder.' The country was afterwards occupied in the 7th century A.D. by the Rājput princes of Jamū; and under the Mughal Emperors, Śālkot became the head-quarters of a fiscal district (*sarkār*). In the centre of the town stand the remains of an ancient fort, popularly believed to have been the original stronghold of Rājā Salwān, although recent excavations show that it has not in all probability existed more than 1000 years. Other similar mounds stand among the outskirts of the town. In modern days, the old fort is of historical interest for its gallant defence by the few European residents who took refuge here during the Mutiny of 1857. It is now dismantled, and the few buildings it contains are used for public purposes.

The population of Śālkot town was returned in 1881 at 33,850, and that of the cantonment at 11,912. Total population of town and cantonment, 45,762, namely, males 25,767, and females 19,995. Classified according to religion, Muhammadans numbered 28,865; Hindus, 12,751; Sikhs, 1942; Jains, 876; Christians, 1321; and Pārsis, 7. Municipal income (1883-84), £5052, derived almost entirely from octroi duties.

The town is very extensive, and is steadily increasing in size and commercial importance, especially since the opening of the railway connecting it with the main line of the Punjab Northern State Railway at Wazīrābād. It is fairly handsome, well built, and clean. Its main streets are wide and open, and either paved or metalled, with good drainage on both sides. The principal are the Kanak *mandī*, or grain market, running north and south; and the *barā bāzār*, containing the shops of all the principal dealers in cloth, jewellery, fruits, etc. The principal buildings, shrines, etc., within the town include the following:—The ruined and dismantled fort alluded to above. A temple erected by Rājā Tej Singh has a conspicuous spire, visible from all parts of the town. The shrine of the first Sikh *gūrū*, R'

Nának (*see* AMRITSAR DISTRICT), is the scene of a famous annual fair, largely attended by Sikhs from all parts of the District. The Darbár Báoli Sáhib, a covered well, erected by a Rájput disciple of Bába Nának, also ranks high in religious consideration among the Sikhs. A Muhammadan shrine of Imám Alí-ul-hak is a handsome building of ancient construction. The public and municipal buildings include the *tahsíl*, police station, dispensary, town hall, post-office, mission school, and four female schools, two *saráis* or native inns, rest-house for village notables and head-men visiting the city, and poorhouse, where cooked food is daily distributed. The roads from Amritsar, Lahore, Gurdáspur, and Gujánwála converge on the Aik stream, which is crossed by an ancient but well-built and substantial bridge. The railway station is situated just outside the town on the north.

The civil station is situated about half a mile north-east of the town, and contains, besides the dwellings of the civil residents, the District court-house, treasury, jail, and police lines. The cantonment lies about a mile north of the town, being built on an elevated ridge of land affording good natural drainage. The cantonment is exceedingly well laid out, and occupies an area of 5 miles in length east and west, by 3 miles north and south. Most of the roads are lined with trees. The principal public buildings in the cantonment are the post-office, telegraph office, two churches, a Roman Catholic chapel, and the general military prison for the Punjab. There are recreation grounds, racquet courts, and a well-kept public garden 27 acres in extent, provided with tennis-courts, station library, and reading-room.

As a local trade centre, Sialkot is fast rising in importance. It has several wealthy bankers and merchants, of whom the most prominent belong to the Jain tribe of Bhábrás. The distinctive industry of the place is the manufacture of paper, carried on in three hamlets forming suburbs to the city. The manufacture is said to have been introduced four centuries ago; and under the Mughal Emperors Sialkot paper was noted for its excellence, being largely used at the Delhi court. In those days, the yearly value is said to have amounted to £80,000; but under the Sikhs it declined rapidly until only twenty mills remained, turning out paper to the value of £2500 a year. At the time of the Settlement of the District (1850-1860) there were 82 mills at work, with an annual out-turn valued at £7500. At the present time the manufacture is again on the decline, owing to the exclusive use by Government of prison-made paper. A description of cloth known as *susi* is also manufactured to a considerable extent; and, next to paper, it forms the principal export. The imports are grain, salt, European piece-goods, metals, and raw sugar.

Sialtek. — Village in Cachar District, Assam; situated on the Barák river, near the boundary of Sylhet, where toll is levied on the

timber, bamboos, etc. floated down stream. Up to 1876, the river tolls at Siáltek *ghát* were farmed out to a contractor, who paid rent at the rate of £1500 a year. Since that date the toll station has been taken under direct Government management, and the receipts have rapidly declined. In 1876-77 they fell to £854, and in 1881-82 to £332. One of the largest *bdzirs* in Cachar is held at Siáltek.

Siána.—Town in Bulandshahr District, North-Western Provinces.—
See SIYANA.

Siársol.—Coal-mine in Bardwán District, Bengal, being a part of the RANIGANJ coal-field. The mineral is a variety of non-coking bituminous coal, with a large portion of volatile matter and ash. The brighter portions consist of very pure coal, a sample of which gave the following results:—Volatile matter, 40 per cent.; fixed carbon, 57·5 per cent.; ash, 2·5 per cent. The composition varies, however, considerably, that of one sample being:—fixed carbon, 51·1 per cent.; volatile matter, 38·5; and ash, 10·4; while selected rich layers gave the following analysis:—fixed carbon, 57·25 per cent.; volatile matter, 41 per cent.; and ash, only 1·75 per cent. The output of coal from the Siársol mine, which is the property of a private company, amounted in 1883 to 39,911 tons, against an average of 34,460 tons in the three previous years. The mine gives employment to upwards of 500 men, women, and children.

Sibi.—District of Southern Afghánistán, ceded to the British by the terms of the treaty of Gandamak in 1881. It lies between 29° 20' and 29° 45' N. lat., and 67° 45' and 68° 15' E. long. It is the most northerly portion of the Kachi plain, from the remainder of which it is separated by a low stony ridge, broken in two places by wide gaps, through one of which the Nari river passes, and through the other the Thali torrent. Beyond this ridge lies the Mal district, which is politically connected with Sibi, though physically indistinguishable from the country under the Khán of Khelat's rule. The plain enclosed by the ridge mentioned above is divided into two parts by the Nari river: the western part, including Dádar, is politically included in the Khelat district of Kachi; while the eastern part is Sibi proper, and was formerly subordinate to the Afghán Governor of Kandahár.

Physical Aspects.—The boundaries on the west, south, and south-east are the Nari and the low ridge mentioned above. On the north and north-east the boundaries are the outer ranges of the hills occupied by the Maris and the Dumar Patháns. The only other hills in Sibi are a group of low, pebbly hillocks in the centre of the plain, on one of which stands the fort of Sibi.

The principal stream issuing from the northern hills is the Nari, the most considerable river of the Indus drainage-system south of the

Gúmal pass Its drainage basin probably includes the plain of Thal Chotiáli and the greater part of the Kakar country. It affords a perennial supply of water as far south as Bágh. After leaving the hills it flows through a depressed alluvial plain from 2 to 3 miles wide, bounded on either side by a high bank. The centre channel of the river brings down a perennial supply of water, and other channels to the east and west are filled during flood. The alluvial plain between the high banks is called the Nari Kach, and is very seldom inundated.

The stream of next importance to the Nari is the Thali torrent, which drains a considerable portion of the Marri hills and emerges into the plain through a narrow defile called the Thali Tonkh, the whole length of which is occupied by a deep pool. The perennial supply of water flowing in and out of the pass is not great, and serves in the cold weather to fill only one canal, which waters some of the Thali lands. Heavy floods come down in the hot weather, and the water is used to irrigate the *kharif* crops of cotton and *jodr* at Thali and Mal.

Between the Nari and the Thali some minor torrents drain the outer range of hills. These are the Arand, Gházi, and Chinmar, the water of which is available for land cultivation for the *kharif* crops.

The soil of the greater part of the plain is clay, of the same nature as that of Kachi generally. In the Nari Kach, or the depressed basin of the Nari, it is a fertile, sandy loam, covered with a dense jungle, which reproduces itself in two or three years after clearing. It is composed mostly of tamarisk, *Tamarix articulata* (*gazlai*) and *Tamarix dioica* (*gaz, lawa kar lawa*); the thorn or thand tree (*kakar, kandi*), *Prosopis spicigera*; the *jál* tree, *Salvadora oleoides* (*phir, kabbar, jál*); the *babúl*, *Acacia Jacquemonti* (*chighird, babhar*); and a great variety of grasses, the most valuable kinds for grazing being *gandil, sain* (*sui, garkha*), and *afdrik* or *manhar*, *Panicum antidotale* (*gom gomadh*), valuable only for its small grain, eaten in time of scarcity. *Saccharum Sara* (*kikh*) and *Cymbopogon twarancusa* (*nadakh*) are also common, as well as the camel-thorn, *Alhagi maurorum* (*shinz jowaha*). On the central plain the jungle is not so dense as in the Kach. The ground, wherever it has lain fallow for a year or two, is covered with patches of scrubby jungle; and extensive tracts are overgrown with different salsolaceous plants (*lana* and *kháfi*) and camel-thorn. In some places, especially west of Khajak, there is dense jungle of *Prosopis spicigera*, *Zizyphus nummularia*, and *Capparis aphylla*. *Salvadora persica* (*tozh, shif*) is occasionally found; and near the hills *Arthanthera Vimivea* (*thip, hidhishk*) and *Calligonum polygonoides* (*phog*). Near the village the *Likar* (*Acacia arabica*) and *ber* (*Zizyphus jujuba*) are cultivated.

Wild hog and ravine deer are abundant; and, among birds, the black

and grey partridge, the *kaulara*, *kunj*, sand-grouse, quail, and pigeon are the commonest.

Agriculture.—Cultivation depends entirely on irrigation, which is mainly from the Nari river. Just below the exit of this stream from the hills, a rough embankment of stones and turf has been thrown half-way across the stream, and by this means a supply of water is turned into four canals.

The crops chiefly cultivated are wheat, barley, and mustard-seed in the cold weather, and *jafr*, cotton, and *til* or sesamum in the hot. The amount of land under cultivation is small. The land is allowed two years' fallow between each crop, and the crops are consequently of good quality. Wheat, which is the staple crop, is extremely fine, especially in the Kach, where the soil is lighter and more sandy than on the central plain, and does not require the same amount of water. The cotton is also very fine, the bushes attaining a great size, especially near Thali. They are planted in lines at a sufficient distance apart to allow of their expanding to their full size. Much of the ground, especially in the Kach, seems well suited for the cultivation of rice; but this is not understood or practised, the reason being probably the uncertainty of the water-supply in the hot weather. Near the villages a few trees are planted, chiefly *ter* or *kunar* (*Zizyphus jujuba*) and *khar* (*Acacia arabica*).

Population.—The population consists of Patháns, Rind Balúchís, Brahuís, Játs, and Hindus, distributed as follows:—Patháns, 6150; Balúchís, 750; Brahuís, 300; Játs, artisans, etc., 4600; and Hindus, 2100: total, 13,900.

The Patháns are the most influential. Their tribes are the Bírakzai, Pannis, and Khajaks, besides scattered families of other tribes. The Nodáni Hassanís are also commonly classed as Patháns, although they claim to be part of the Hassani tribe who formerly inhabited the Sham plain, and are now scattered about Barkhan and Thal Choti, and this tribe is usually classed as Balúchi. The Silanchi of Thal also rank as Patháns. The Rind Balúchís are mostly of the Bolak tribe. There are scattered families of the Par, Chandi, Chani, Lashari, Pitafi, Bughti, Gurgej, Lund, and Gishkori. Brahuís are mostly of the Gwaharumzai tribe, and a few of the Kurk.

Játs are found in most of the villages; and a considerable number of artisans and workmen, such as barbers, carpenters, blacksmiths, butchers, &c., are also numerous.

The Bírakzai family hold the foremost rank. Pannis is a Bírakzai, and under the Naib was always held by him.

The remainder of the Pannis are divided into five sections—the Marghazanis, Saphis, Kurks, and Mizris living in Kurk, and the Dahpals living in Sibi.

The Khajaks are Patháns of the Kakar tribe; they live entirely in the town of Khajak, and are divided into eight sections. They are but little under the control of the hereditary chief. The Khajaks used to be at perpetual feud with the Bárákzais and Pannis; but peace has been made since the occupation of the country by the British Government.

The Nodáni Hassanis number about 264, and are scattered about in Kurk, Khajak, Sibi, and their original village of Gulu Shahr, which they recently abandoned.

The Silanchis are a tribe of Patháns living in Thali. They number 660.

The other Patháns, besides those mentioned above, are of the following tribes:—Abdullá, Khaili, Piárdni, Jaduni, Sodí, Pírang, Dahar, and Davi. They number altogether about 336 souls.

The Gwaharamzai tribe of Brahuís are settled at Mal and Kurk. They number about 216 in the former place, and 84 in the latter.

The Rind Balúchís, comprising the Ghulám Bolaks and Pers, occupy the village of Bukhru or Ghulám Bolak. They number about 480. The other Balúchís scattered about Kurk, Sibi, and Thali are of the Gurchani, Lashari, Pitafi, Bughti, Chandya, Gurgej, Lund, and Gishkori tribes; they number 264.

The Játs are found in all the villages except Ghulám Bolak, and are generally tenants of the Pathán proprietors. The most considerable tribes are the Baghwáns (Arains), Muchis, and Hambis. The trading classes, artisans, and shopkeepers are found mostly in Kurk, Khajak, and Sibi.

The seven inhabited towns or villages are—Sibi, Kurk, Khajak, Gulu Shahr, Ghulám Bolak or Bakrî, Thali, and Mal. The ruins of numerous deserted villages indicate that the population of the country was formerly much greater than at present. The languages spoken are Pushtu, Balúchí, Sindhí, and Brahuí. Sindhí and Balúchí are commonly understood throughout the country.

Trade, etc.—The local industries are unimportant. Coarse cloth is woven for home consumption. There is a considerable manufacture of barilla or *sajji*, which is of superior quality, as only the *khal* bush (which is very plentiful) is used, and the other kinds of salsolaceous plants are not mixed with it, as is often done elsewhere.

Trade is carried on both with Sind and Khorasán. The articles imported from Khorasán are rice, *múg*, *dál*, goats' hair-thread (for ropes), *namda* or felt, wool, almonds, and *boris* or bags for carrying goods. From Sind come sugar, *gur*, sweetmeats, spices, salt, and cloth of all sorts. The exports to Sind include part of the imports from

Khorasán The local products exported are wool, *ghil*, barilla or *saggi*, and wheat, barley, and *yadr*.

History.—Of the early history of Sibi, but little is known. Tradition represents it as having been at one time the centre of a considerable kingdom which embraced the whole of the hill country to the north, and which still bears the name of Sewistán. The communications with Thal Chotidli are easy, and the route through Sibi to that part of Afghanistan was a well-known one till closed by the depredations of the Maris.

The earliest historical mention of Sibi occurs in Bábar's autobiography (Leydn's *Bábar*, ed. 1826, p. 164). Bábar was marching from the Indus to Chotidli, probably *via* the Sakhi Sarwar pass. He passed through the country of Rudi, which seems to be the Barkhan valley, and there found Fazil Gokaltash, the Darogah of Sibi, who had come out with 20 men to reconnoitre. Fazil Gokaltash was in the service of Sháh Beg Arghan. This was in A.H. 911 (A.D. 1505). Sháh Beg was son of Zulnun Beg, Governor of Kandahár, under the Khorasán Kings, and ultimately (in A.H. 928, A.D. 1521) conquered the whole of Sind, and established the Arghan dynasty there (Briggs' *Ferishta*, ed. 1829, vol. iv. p. 432). Bábar's conquests do not seem to have extended so far south as Sibi, which probably remained in the hands of the Arghans.

To this period belongs the legendary hero of the Balúchís, Mír Chakar, who is said to have founded the fort of Sibi. He appears to be identical with Mír Chakar Rind, who is mentioned by *Ferishta* as having come to Múltán and obtained a *júgir* at Uchh in A.D. 1520 (Briggs' *Ferishta*, vol. iv. p. 396). The Balúchís seem to have been very powerful at Múltán, and were able to afford protection to Daulat Khán Lodí when he fled from Ibráhím Khán in A.D. 1524 (Briggs' *Ferishta*, vol. ii. p. 38).

The legends represent Mír Chakar to have been at perpetual war with Humáyún (Human Chughatta), and this may have a historical foundation in the attacks made on Humáyún by Balúchís on his flight towards Kandahár (Erskine's *Bábar* and *Humáyún*).

After the conquest of Sind by the Mughals, Sibi must have formed part of the Mughal Empire, and so continued till the rise of the Durani kingdom under Ahmad Sháh. The settlement in Sibi of the Khajaks, Bárakzais, Pannis, and other Patháns had probably taken place before this, and the county remained attached to the power holding Kandahár. As the Durani kingdom broke up, Sibi passed with the rest of Afghanistan under the rule of the Bárakzai Sirdárs, the chief of the Bárakzais acting as Naib under the rulers of Kandahár. From 1839 to 1842, Sibi was occupied by the British in the name of Sháh Shuja. The old fort was put into repair and used as a commissariat depôt.

Granaries were built, which are still in existence, and are now undergoing repairs. The revenue was collected in kind at one-third of the gross produce. The Khajaks refused to pay on one occasion, and a force was sent against them, which destroyed their town. After their submission, they were allowed to pay only one-fifth of the gross produce as revenue, in order to enable them to repair their houses.

In 1843, Sibi came again under Bārakzai rule, Khán Dīl Khán and Sádik Muhammad Khán being Sirdárs of Kandahár. They continued to collect the revenue in kind till 1846-47, when the cash assessment, which has prevailed till the present day, was introduced. The country was for long in a distracted condition owing to internal dissensions and the ravages of the Marris.

Sibi is one of the Afghán districts assigned to the British Government by the treaty of Gandamak. Since then its condition has been uneventful and prosperous. Its administration is carried on under the control of the Governor-General's Agent in Balúchistán. It forms part of the charge of the Political Agent of Thal Chotiál, in subordination to whom there are a native Assistant Agent, a *tahsildár*, and a *munsif*. No troops are regularly stationed in the district, but there are police and tribal levies.

Under Afghán rule, the revenue of the district was represented by a fixed payment of £1000, which was remitted to the Amír's treasury by the chief of the Bārakzais. Under British administration, the revenue is collected in kind at uniform rates of one-fifth of the gross produce in the *rabí* crop, and one-sixth in the *kharif*, amounting in value to £11,215 in 1884-85.

The town of Sibi has developed very largely of late, and is now administered on municipal principles. It is a station on the newly opened Sind-Pishín Railway, the head-quarters of the Political Agent, and in the cold weather of the Agent to the Governor-General in Balúchistán.

Sibi.—Village with religious fair in Túm-kúr District, Mysore State.—*See* SIBBI.

Sibpur (Shibpur).—Suburb of Howrah town, Húglí District, Bengal; situated in lat. 22° 34' N., and long. 88° 16' E., opposite Fort William. The place has grown since the beginning of this century from a small village into a flourishing town; inhabited chiefly by Government and other clerks, and by labourers employed on the various mills and foundries, and on the East Indian Railway works. On the river-side are the Albion works, consisting of a flour-mill and a distillery. To the south of Sibpur are the Royal Botanical Gardens, one of the finest of their kind in the world. A little above the gardens, an important technical school of industry—the Sibpur Engineering College—occupies the buildings and premises of the old 'Bishops

College,' now transferred to Calcutta. Sibpur is a permanent mart for District produce; bricks are largely made and exported to Calcutta.

Sibságar (*Sibsánger*).—A British District in the upper valley of Assam, lying between $26^{\circ} 19'$ and $27^{\circ} 16'$ N. lat., and between $93^{\circ} 21'$ and $95^{\circ} 25'$ E. long. Area, 2855 square miles. Population (as ascertained by the Census of 1881), 370,274 souls. Bounded on the north and east by Lakhimpur District, the Brahmaputra marking the boundary for the greater part of the distance; on the south by the Nágá Hills District; and on the west by Nowgong District. The administrative head-quarters are at SIBSÁGAR TOWN, situated about 11 miles inland from the south bank of the Brahmaputra.

Physical Aspects.—The District presents the appearance of a level plain, much overgrown with grass and jungle, and intersected by numerous tributaries of the Brahmaputra. Along the bank of the great river and its branches, the land lies very low, and is exposed to annual inundation; in the interior, the country rises towards the Nágá Hills in the background, and the cane-brakes and grassy swamps of the valley give place to jungles of heavy timber. The District is divided by the little stream of the Disái into two tracts, which differ in soil and general appearance. East of the Disái the surface is very flat, and the soil consists of a heavy loam of a whitish colour, which is well adapted for rice cultivation. The general level is only broken by the long lines of embankments which were raised by the Ahom kings, to serve both as roadways and as a protection against floods. West of the Disái, though the surface soil is of the same character, the general aspect is diversified by the protrusion of the subsoil. The latter is a stiff clay, abounding in iron nodules, and furrowed by frequent ravines and watercourses, which divide the cultivable fields into innumerable small sunken patches, locally known as *holds*.

In the inner part of the District towards the hills, the country is clothed in dense forest with an underwood of thorny creepers, which swarm with leeches when the rains begin to set in. This latter region is generally preferred for tea cultivation, as high forest glades are considered more suitable for the tea-plant than grass land. Where the land still lies waste in the tract in which the husbandmen cultivate rice, it is overgrown with tall grass from 15 to 20 feet high, amid which are isolated patches of cultivation.

There are no mountains within the limits of the District. The chief river is the Brahmaputra, forming the continuous northern boundary, which is navigable all the year through by steamers and large native boats. Its principal tributaries, beginning from the north-east, are the Dihing, which for part of its course divides Sibsaigar from Lakhimpur District; the Disang, Dikhu, Thanzí, Disái, Kakadungá, and the Dhaneswari or Dhansiri, which all flow in a northerly direction from

the Nágá Hills. The most signal example of alluvion in the whole Province is afforded by the Májuli *char*, included within the District of Sibságar. This island is included between the present stream of the Brahmaputra, which forms its southern boundary, and the old bed which forms its northern. The latter is now known as the Lohit river, and derives most of its water from the great affluent, the Subansiri, which brings down from the north much of the silt of which the island is formed. The soil is a rich alluvium suitable for every kind of crop. It contains an area of about 400 square miles, almost entirely overgrown with grass and jungle. The fisheries of the District, which are Government property, yield an annual revenue of about £2300 a year. There are no lakes, canals, or artificial watercourses in Sibságar; but there are many extensive marshy wastes, in which rattans and canes grow wild, and long-stemmed varieties of rice are cultivated.

Wild beasts of all kind abound, including elephants, rhinoceros, tigers, bears, buffaloes, and deer. In 1882-83, £800 was paid to Government for the privilege of capturing wild elephants.

Among the trees indigenous to the forests of Sibságar, and producing valuable timber, are the *súm* (*Artocarpus Chaplasha*), *gamari* (*Gmelina arborea*), *pomá* (*Cedrela Toona*), and some species of *Lagerstrœmia* and *Dillenia*. All these trees grow to a great height, and throw out numerous branches. Their wood is used for many purposes, and the most durable canoes are made from it. Next in importance to these timber trees are the *káthál* (*Artocarpus integrifolia*), *uriam* (*Bischoffia javanica*), *kálá jám* (*Syzygium Jambolana*), *titli* (*Tamarindus indica*), some specimens of *takrá* (*Bauhinia*) and *nahor* (*Mesua ferrea*). Of all the plants of the District, the bamboo is the most useful. The natives have several specific names for the different varieties of the bamboo; such as *jánti-báns*, *bháluká-báns*, *mákál-báns*, *bazal-báns*, etc. The trees used for rearing silkworms on are the *adakur* (*Tetranthera quadrifolia*), *súm* (*Machilus odoratissima*), *pilá-champá* (*Michelia pulneyensis*), and *eriá* (*Ricinus communis*). Rattans grow wild throughout the waste lands, so luxuriantly as to form an almost impenetrable jungle. Innumerable varieties of creepers are found. The jungle products consist of caoutchouc, lac, beeswax, and various fibres and dyes. Ivory is also exported. The Málo Kaliáni Diha and Arali Tál are large patches of grazing ground, used during the winter months as pasturage for thousands of buffaloes and cows, but covered with water during the rains. The mineral wealth of the District is said to comprise coal, iron, petroleum, and salt, but none of these have been profitably worked. A little gold dust is washed in several of the hill streams. Some hot sulphur springs are situated near the banks of the Dhaneswarí, and its tributary the Nambar; but they lie beyond the border in the Nágá Hills District.

History.—Sibságar District first rose into prominence as the headquarters of the Aham dynasty, which ruled Assam for about 400 years before the British annexation. Prior to the advent of the Ahams, the dominant race was the Chutiás, of a kindred origin to the Ahams, who only subjugated the Chutiás after a fierce contest. At the present day, these two tribes form nearly one-half of the total population. The Ahams, a people of Shan origin, are said to have first made their appearance in Upper Assam in the 14th century, after the downfall of the legendary Hindu kingdom of Kámrúp. They gradually spread down the valley of the Brahmaputra, until in the 17th century they were able to hold their own at Gauhati against repeated invasions of the Mughals. It does not appear that they brought any religion with them from their native hills; but in course of years they fell under the influence of Hinduism, and at the same time lost the virtues of military and civil administration, by means of which they had founded their empire. At last, in order to protect themselves against internal dissensions, they were compelled to call in the assistance of the Burmese, who tyrannized over the country with great severity, until they were in their turn driven out by the British in 1823.

The original capital of the Ahams was at GARHGAON in this District, on the Dikhu river, a short distance south-east of Sibságar town, where numerous ruins are still to be seen. The city and its suburbs appear to have extended over many square miles; and the royal palace itself was surrounded by a brick wall, about 2 miles in circumference. It has been noticed that one of the many gateways is built of large blocks of stone bearing marks of iron crampings, which show traces that they once belonged to a far more ancient edifice—thus attesting the primitive Hindu traditions of Kámrúp as told in the *Mahábhárata*. The whole is now overgrown with dense jungle; and the natural course of decay has been hastened by the hand of man, for the old bricks are found serviceable on the tea-gardens of the present day.

The second Aham capital was at RANGPUR, immediately to the south of Sibságar town, which is said to have been founded in 1698 by Rájá Rudra Singh, the first Aham prince who submitted himself to the Bráhmans. The ruins of his palace, and a temple which he built at Jaiságar, still exist amid the deep jungle. To the eldest son of this monarch is assigned the excavation of the great tank, 114 acres in area, around which has been built the modern station of Sibságar. Rangpur continued as the royal residence until 1784, when the Aham kingdom began to be dismembered. The Raja, named Gaurináth, fled before his rebellious subjects, who had advanced against him from the east. He first stopped at Jorhat on the Disai river, in the centre of Sibságar District, but was ultimately compelled to retire to Gauhati.

With British assistance, he was enabled to return to Jorhát, where he died in 1793.

Apart from the ruins of successive capitals, the Ahams have left permanent traces of their power in the great lines of embankment running through the country, which are locally known as *dlis*. These were constructed by a system of forced labour, and served both as roads and as protections against river floods. The entire method of Aham administration was based upon personal servitude. The country was parcelled out into executive Districts, each of which was under the control of a taskmaster; no money revenue was demanded, but compulsory service was exacted from every individual among the subject races as his contribution to the needs of the State. The recollection of this organized slavery still lives in the minds of the people. At the present day, it is found almost impossible to obtain labourers to work on the roads, or other Government undertakings. The peasantry are willing to take employment on the tea-gardens, when not occupied on their own little plots of rice; but to work for Government is held to involve indelible disgrace. Hence it is that the great works of the Aham period have been suffered to fall into disrepair, and the incursions of the rivers have thrown much good land out of cultivation.

When the British expelled the Burmese from Assam in 1823, the Government was indisposed to undertake the responsibilities of administration beyond what seemed absolutely necessary. A military outpost was stationed at Sadiyá, at the extreme head of the Brahmaputra valley, but the civil government by European officials was not extended farther east than the confines of Nowgong. The tract that now forms Sibsagar District, together with the southern portion of Lakhimpur, was handed over to a native ruler, Rájá Purandhar Singh, who was guaranteed the secure exercise of his authority on condition of paying a tribute of £5000 a year. This unsatisfactory arrangement produced the results which might have been anticipated. The Rájá, protected by the British name from the consequences of his misrule, indulged himself in the most wanton oppressions upon his helpless subjects, and rendered their condition even more miserable than it had been under the Burmese invaders. It is on record that the country became so depopulated that it was unable to furnish the British tribute. Under these circumstances it was found necessary in 1838 to dispossess Purandhar Singh, and to place Sibsagar under the direct management of an English officer. The early reports of those days are confined to complaints of the extreme misery to which the country was reduced. The tea industry, however, has now brought itsht back prosperity; and at the present time the Sibsagar peasantry rank among the most contented and wealthy in Assam.

Population.—Mr. Robinson, in his *Descriptive Account of Assam* (1840), roughly estimated the population of Sibságar District, which then included great part of Lakhimpur, at 200,000 souls. Another estimate in 1853 gave a total of 211,477. The first regular Census was taken in 1871; and the enumeration, instead of being taken in a single night as in Bengal, was prolonged over the two months of November and December. The results disclosed a total of 296,589 persons, on an area corresponding to the present District. The Census of 1881 was synchronous, and was, as elsewhere throughout British India, effected on the night of the 17th February. It returned a total population of 370,274, showing an increase of 73,685, or 24·83 per cent., for the nine years between 1872 and 1881. The natural increase of births over deaths accounts for about half this increase, the remainder being made up by immigration from Bengal.

The results of the Census of 1881 may be summarized as follows:—Area of District, 2855 square miles, with 1 town and 1982 villages, and 63,576 houses. Population, 370,274, namely, males 195,194, and females 175,080; proportion of males, 52·7 per cent. Average density of population, 129·7 persons per square mile; towns or villages per square mile, ·62; persons per town or village, 187; houses per square mile, 22·3; persons per house, 5·8. Classified according to sex and age, there were in 1881—under 15 years of age, boys 77,164, and girls 73,849; total children, 151,013, or 40·8 per cent. of the population: 15 years and upwards, males 118,030, and females 101,231; total adults, 219,261, or 59·2 per cent.

The ethnical division of the people shows—Europeans, 168; Eurasians, 139; aboriginal and semi-aboriginal tribes and castes, 215,224; Hindus, 139,075; Muhammadans, 15,665; and Chinese, 3. The chief feature in this classification is the large proportion of semi-Hinduized aborigines, as compared with the rest of Assam. On the one hand, the hill tribes of the northern Himálayas and of the eastern Burmese Mountains are poorly represented; while, on the other, the castes of Bengali Hindus have not penetrated so far east. The great bulk of the population are pure Assamese, more or less converted to Hinduism. The once dominant race of Ahams, numbering 117,872, still supplies nearly one-third of the total population. Though they have now sunk to the level of common cultivators, they retain many of their ancient habits and institutions. Some of them eat beef and pork, and also bury instead of burning their dead. Next in number come the Chutiás (29,952), who have already been referred to as of the same original stock as the Ahams, and their predecessors in the government of the upper valley of the Brahmaputra. The Kochs (24,248) are members of a tribe whose present head-quarters are in the Bengal State of Kuch Behar, but who ruled at one time over the

greater part of Assam, before the arrival of the Ahams. The Doms (22,867) are a curious race, who lay claim in Assam to high-caste purity, but reject the ministrations of Bráhmans. Bhumij's number 18,492. The aborigines proper include—the Cacharís (19,753), who are largely employed on tea-gardens; Mírís from North Lakhimpur (10,836); Mískirs (1403); Nágás (1405); Shans (275); Lalungs (319); Mechs (228); Gáros (185); Manipurís (50); besides a sprinkling of Kols, Uráons, and Santáls, who are imported labourers from Chutiá Nágpur.

Among the Hindus proper, Bráhmans number 11,607, being especially numerous for an Assam District; Rájputs, 1428; Káyasths, 3109; and Jain traders, from the north-west of India, 997. The most numerous caste in the District is the Kalitá (33,812), who supplied the priesthood for the Kochs, Doms, and Ahams before the introduction of Bráhmanism. The Kalitás now rank as pure Súdras, on a level with the Káyasths, and are generally engaged in agriculture or Government service. Other Hindu castes include the following:—Keut or Kewat, 17,736; Katáni, 5404; Munda or Murah, 3420; Kurmí, 3314; Boriá, 2791; Nat, 1963; Ganak, 1531; Harí, 1374; Kumbhár, 1296; Baurí, 1207; Tántí, 1198; Goálá, 920; Ghátwál, 732; Nápit, 718; and Kahár, 436.

Religion.—Classified according to religion, the population consists of—Hindus (as loosely grouped together for religious purposes), 339,663, or 91·8 per cent.; Musalmáns, 15,665, or 4·2 per cent.; Christians, 804 (including 462 native converts); Buddhists, 275; Jains, 37; Brahmo, 1; and non-Hindu aboriginal tribes, 13,829. There are five principal Hindu *sástrás* or religious institutions of a monastic character, each presided over by its own high priest or *gosáin*; and 83 minor *sástrás*. The *gosáins* have a large number of followers, and hold much revenue-free land, both in this and the other Assam Valley Districts. The Bráhma Samáj is represented by a few followers, who are all immigrants from Bengal. The Muhammadans of Sibságar are said to be descended partly from artisans introduced by an early Ahom Rájá, and partly from soldiers left by the invading Mughal armies. Many of them have joined the Fardázi or reformed sect, but they are not actively fanatical, and have ceased to make proselytes. The native Christians are under the care of a branch of the American Baptist Mission, which has been established in Sibságar since 1840. The Society is represented by two missionaries, one of whom usually resides in a village on the lower slopes of the Nágá Hills, where he has charge of a considerable number of converts.

Urban and Rural Population.—The population of the District is entirely rural, being employed either on rice cultivation or the tea-gardens. They evince no tendency to gather into towns or seats of

commerce, and very few natives of Sibsagar depend upon trade as a means of livelihood. Some few petty traders buy small quantities of goods from the Mārwarī merchants who visit the District, and retail them in the village shops; but these have, almost without exception, their little patches of arable land which they cultivate themselves, and from which their household wants are supplied. The only place with a population of more than 5000 is SIBSAGAR TOWN, which contains (1881) 5868 inhabitants. It is situated about 9 miles inland from the south bank of the Brahmaputra, and, besides the houses of the civil officials, possesses a large *hizār*, in which a brisk business is conducted during the cold season with the neighbouring hill tribes. JORHAT, on the Disāi river in the centre of the District (population 1978), is the home of several Mārwarī and Muhammadan traders, who supply the wants of the labourers on the tea-gardens. GOLAGHAT, on the Dhaneswarī (population 1754), is the only seat of river traffic in the District, being accessible to steamers from May to November. It is now a fairly large station, with a good *hizār*, treasury, telegraph office, and *duk* bungalow; it is also the seat of an Assistant Commissioner. NAZIRA, on the Dikhu, about 9 miles from Sibsagar by road, is the head-quarters of the Assam Tea Company, containing a large *hizār*, several good European houses, steam mill, and store for English goods. The ruins of GARHGAON and RANGPUR have been already referred to.

Of the 1983 villages or clusters of hamlets, 1548 contain less than two hundred inhabitants; 413 between two and five hundred; 19 between five hundred and a thousand; and only 3 more than one thousand.

As regards occupation, the Census of 1881 returned the male population of Sibsagar District under the following six main headings.—(1) Official and professional class, 1337; (2) domestic class, 666; (3) commercial class, including merchants, traders, carriers, etc., 3242; (4) agricultural and pastoral class, including gardeners, 119,608; (5) industrial class, including all manufacturers and artisans, 1681; (6) indefinite and non-productive class, comprising general labourers and male children, 68,660.

Material Condition of the People.—The inhabitants of the District are described as a contented and happy people, having but few wants, and those very easily supplied, as rice is almost the only article grown for food, the rest being obtainable from the jungles and streams. They still live, however, in the same primitive manner as their forefathers; their agricultural implements and cattle, their food and clothing, being all exactly as they were fifty years ago. A marked indication of the prosperity of the people is the great difficulty experienced in obtaining labour, even at high rates of wages. If there is any exception to the general prosperity, it is amongst a few families of the better class, the members of which are, or consider themselves to be, above manual

labour. They find it getting more and more difficult to get their holdings cultivated for them, and to keep up the social position they formerly enjoyed.

The shopkeeping class generally live in somewhat substantial buildings, consisting of two or more rooms under a single roof; while the dwelling of a common husbandman usually consists of two or three small detached huts, each containing from two to four rooms, and constructed of wood, bamboo, grass, and reeds. These huts are very low, damp, ill-ventilated, and built so close to one another as to render them almost inaccessible to light and air. Each hut seldom has more than one small door, just large enough to admit one man at a time, and has no windows at all. The houses are grouped together into villages, without any regard to arrangement or sanitary considerations. They are generally surrounded with clumps of bamboos, plantain, betel-nut, and *sûm* trees, and, viewed from a distance, present a very picturesque aspect. Small quantities of tobacco, mustard, and sugar-cane are cultivated in the immediate vicinity of the villages, each family raising sufficient to supply its own household wants.

The ordinary food of the people consists of rice, pulses, fish, and vegetables. The use of flesh as an article of food is very rare. The vegetables used by all classes of natives consist chiefly of leaves and tender stems, generically called *sdg*. Other vegetables, such as potatoes, carrots, cabbages, turnips, onions, etc., are grown to a small extent, for sale to the European residents. Milk is very little used by the mass of the people, though *dahi* (butter-milk) is much consumed by the higher classes. The lower classes seldom use oil; and instead of salt, they use potash procured by burning plantain leaves. Clarified butter and sugar are only consumed by the comparatively wealthy. Both shopkeepers and cultivators raise nearly every article of food they require for domestic consumption.

Agriculture, etc.—The staple crop throughout the District is rice, which furnishes two great harvests in the year. The *sâli*, corresponding to the *dman* of Bengal, is sown on low lands about June, transplanted in the following month, and reaped in November. Its finer varieties are sometimes comprised under the generic term of *ldhi*. The *shu* or *shus* is sown on high lands about March, and reaped in July, leaving the field ready for a cold-weather crop of pulses or oil-seeds. A third crop of rice, called *bâo*, is grown on the borders of marshes or the banks of rivers, being sown about April, and reaped in November. This is a long-stemmed variety, and can keep pace in its growth with the rise of flood water. The other crops include Indian corn, several varieties of pulses, mustard grown as an oil-seed, sugar-cane, *adn* or betel leaf, and cotton and indigo raised only by the hill tribe of *Mrls*. The *sûm* tree (*Machilus odoratissima*) is an important object of attention

in the neighbourhood of villages, for the sake of the silkworm that feeds on its leaves.

According to the most recent statistics, the area under cultivation in 1883-84 was 327,221 acres, or less than one-fifth of the total area of the District, though the greater part of the remainder is capable of tillage. Crop area in 1883-84—Rice, 211,332 acres; other food-grains, including pulses, 5895 acres; oil-seeds, 10,157 acres; sugar-cane, 4311 acres; tea, 40,532 acres; other crops, 62,869 acres; total, 335,096 acres, of which 7875 acres produced two crops in the year. Manure, in the form of cow-dung, is only used for sugar-cane and other special crops. Irrigation is adopted in the case of *silli* rice, when water can be easily obtained from natural watercourses. It is not customary to allow land to lie fallow. Spare land abounds on all sides, and the present tenures are favourable to the cultivator. As throughout the rest of Assam, the State is the general landlord, but the cultivators, either by contract or status, possess a heritable and transferable right in all land cultivated permanently. Under native rule, the main source of revenue was a sort of capitation tax, raised at the rate of 4s. on each plough, and 2s. on each hoe. The first land settlement, commenced in 1839, assessed the revenue at 1s. 6d. an acre on *rupit* or moist lands, on which *silli* rice is grown, and 9d. an acre on all other lands. In 1844 these rates were raised respectively to 1s. 10d. and 1s. 4d. At the present time, *basti* or homestead land pays 6s. an acre; *rupit*, 5s. 9d. an acre; and *faringhāti*, on which *dus* rice and other crops are grown, 3s. an acre. The average out-turn of paddy from an acre of rice land is estimated to amount to about 14 cwt., worth about £2. This, after husking, would give about 9 cwt. of rice, locally worth £3, 6s.

Spare Land.—There is a very large quantity of spare land in Sibsagar, and the present tenures are undoubtedly favourable to the cultivator. Waste lands for the extension of tea cultivation have been granted at very favourable rates. Those granted to the Assam Company were given rent-free for twenty years; after the expiration of that term, a rent is payable of 1s. 2d. per acre for three years, and thereafter 2s. 3d. per acre for a further period of twenty-two years. All the ordinary arable lands in the District are held by the cultivators on a lease direct from Government.

Landless Labouring Classes.—There appears to be no tendency towards the growth of a separate class of day-labourers in the District, neither renting nor possessing land of their own. On the contrary, the class who used formerly to cultivate the lands of others seems to be decreasing in numbers, and the want of labour is seriously felt. Men who cultivate the fields of others are termed *bandūs*, and generally receive in exchange for their labour merely their food and clothing, with a small

allowance of money. The Assamese form a comparatively small part of the labourers employed in the tea-gardens, coolies being imported from Bengal for this purpose. Those natives of the District who do seek employment on the tea plantations generally have small farms of their own, on which they cultivate sufficient for their own household wants. The Cacharís furnish a considerable proportion of the labour on the tea-gardens. Women and children are not largely employed in the fields except at the sowing and harvesting seasons.

The rate of wages for ordinary unskilled labour is said to have doubled within the past twenty years, owing to the extension of tea cultivation; and the demand for skilled labour has risen in a still greater proportion. Indeed, labour of all kinds requires to be imported from Bengal. A common day-labourer is procurable with difficulty at 6d. a day. Male coolies on the tea-gardens are engaged at 10s. a month, and women at 8s.; but these rates can be almost doubled by taking taskwork. A second-rate blacksmith or carpenter receives £3 or £4 a month, and a bricklayer £1, 12s. The prices of food-grains have risen in like proportion. The following are the rates for 1872, which were somewhat above the average of recent years:—Common rice, 7s. 2d. per cwt.; pulses, from 9s. 9d. to 13s. per cwt.; oil, £2, 6s. per cwt.; salt, 10s. 8d. per cwt. In 1866, the year of the Orissa famine, the price of common rice rose to 14s. per cwt.

Sibsagar District is not especially exposed to either of the calamities of flood or drought. The valley of the Brahmaputra is subject to annual inundation, owing to the old embankments having been allowed to fall into a bad state of repair; but it is not known that the general harvest of the District has ever been affected thereby. Partial drought is sometimes caused by deficiency of local rainfall. The season of 1857 is still remembered by the people as having resulted in a scarcity from this cause, which raised the price of common unhusked rice to 7s. 6d. per cwt. The people mainly depend for their food supply on the *silki* rice crop; and if this were to fail, it would be difficult to supply its place either from the other crops or by importation.

Manufactures, etc.—The local industries are limited to the weaving of silk and cotton cloth, the making of domestic utensils from brass and bell metal, and a coarse description of pottery. The silk cloth is woven of various degrees of fineness, and is divided into four classes:—*mejlikuri*, the finest of all from the cocoons of a worm fed on the *adikuri* tree; *pat*, from the Chinese silkworm fed on the mulberry; *mugi*, the best known, from a worm fed on the *sim* tree; and *erit*, which is very coarse, from a worm fed on the castor-oil plant. The finest raw silk has been sold for as much as £1, 16s. per pound; but the manufacture has greatly fallen off in recent years, owing to the

competition of cotton piece goods imported from Europe. The braziers are almost entirely supported by a system of advances made by Márwári capitalists, at the rate of 6d. per pound for brass, and 1s. per pound for bell metal.

Commerce and Trade.—The trade of the District, also, is mainly confined to the Márwáris. The principal seats of commerce are Jorhát, Golaghat, and Sibságar town. The two latter places are the resort of large numbers of Nágis during the cold season, who bring down raw cotton and vegetables to barter for salt, fish, poultry, and cattle. Cotton is commonly exchanged for half its weight of salt. There are no large annual fairs, similar to those held in Lower Assam. The principal exports from the District are tea, silk, mustard seed, cotton, and jungle products; the imports are salt, oil, opium, piece-goods, and miscellaneous hardware.

Tea.—The cultivation and manufacture of tea is largely carried on by European capital and under European supervision; and in this industry Sibságar ranks as the first District in Assam Proper, being only surpassed in the whole of India by Cachar District in the Surmá valley. The Assam Tea Company, which commenced its operations in Lakhimpur, had opened fifteen factories in Sibságar by 1852, with 2500 acres under cultivation, and an out-turn of 267,000 lbs. Soon after that date, many private gardens were taken up by Europeans and natives; and in 1869, after the recovery from the panic caused by excessive speculation, there were 110 gardens in cultivation, managed by 53 European and 233 native assistants, and employing a monthly average of 13,399 imported and 790 local labourers. The statistics for 1874 show 22,573 acres under cultivation, out of a total of 108,050 acres taken up, mostly in fee-simple; and an out-turn of 4,976,419 lbs. of tea, being an increase of 554,898 lbs. on the previous year. By 1883-84, the area under plant had increased to 40,532 acres, and the estimated out-turn (believed however to be excessive) to 12½ million lbs., the average out-turn under mature plant being 335 lbs. per acre.

The chief means of communication in the District are afforded by the Brahmaputra and Dhaneswarí rivers, both navigable by steamers, but the latter only during the rains. The roads all follow the lines of the *úlis* or old embankments constructed by forced labour under the Aham kings. The Trunk Road, maintained by the Public Works Department, runs through the entire length of the District for a course of 133 miles. The aggregate length of the District roads in 1883 was returned at 420 miles, of which 305 miles were classed as important. Wheeled conveyances are now in general use, most of the roads having been bridged at river crossings.

Administration.—The District administrative staff ordinarily consists of a Deputy Commissioner, two Assistant and four Extra-Assistant Com-

missioners, District Engineer with two Assistants, Civil Surgeon, and Superintendent of Police. In 1870-71, the total revenue of Sibságar District amounted to £93,853, of which the land-tax contributed £43,976, or 47 per cent., and *dhkiri* or excise £42,090, or 46 per cent.; the expenditure was £35,194, or about two-fifths of the revenue, and the item of 'cost and conveyance of opium' absorbed £13,842, which is properly a debit against the revenue from excise. By 1882 the revenue had increased to £125,645, while the expenditure was £27,994. As throughout the rest of Assam, owing to the circumstance that an assessment is made annually with the cultivators, the land-tax is a very elastic source of revenue, having increased from £7013 in 1840 to £11,120 in 1850, and £48,758 in 1875. In 1883 there were 3 covenanted European officers stationed in the District, and 10 magisterial and 7 civil and revenue courts open. The regular and municipal police force consisted of 335 officers and men, maintained at a cost of £6188; showing 1 policeman to every 8.5 square miles of area, or to every 1106 of the population, and an average cost of £2, 3s. 4d. per square mile and 4d. per head of population. There is no village watch or rural police in the District. In the same year, the total number of persons convicted of any offence, great or small, was 458, or 1 to every 388 of the population. By far the greater number of the convictions were for petty offences. There is 1 jail at Sibságar town, and Sub-divisional lock-ups at Golághát and Jorhát. In 1883, the daily average number of prisoners was 91.7, of whom 2.2 were females; the labouring convicts numbered 83.7.

As is the case in Assam generally, education until recently had made but little progress among the people. In 1856, the number of schools in the District was only 12, attended by 794 pupils. The figures for 1860 show a positive decrease; but by 1870 the number of schools had risen to 29, and the pupils to 1084. The reforms of Sir G. Campbell, by which the benefit of the grant-in-aid rules was extended to the village schools or *Pathsalis*, have produced scanty effect in this part of the country. In 1873, there were 39 schools under inspection, attended by 1440 pupils. By 1883, the number of State aided and inspected schools had increased to 159, attended on the 31st March 1884 by 5767 pupils. Indigenous vernacular unaided schools numbered 11, with 177 pupils. The Census Report of 1881 returned 2828 boys and 79 girls as under instruction, besides 6765 males and 171 females able to read and write but not under instruction. The chief educational establishments are the Government English school at Sibságar town, attended on 31st March 1884 by 224 pupils; the Jorhát high school, with 255 pupils; the Assam Company's school at Nazirá, with 137 pupils; and the normal school, with 13 pupils.

For administrative purposes, the District is divided into the 3 Sub-

divisions of Sibságar, Jorhát, and Golághát, and into 4 *thánds* or police circles, namely, Sibságar, Bartola, Jorhát, and Golághát, with outpost stations at Selung, Kanlabari, and Dhansirimukh. The number of *mauzás* or revenue collections of villages, each under a *mauzáddár* or revenue official, is 65. The only municipality in the District is Sibságar town.

Medical Aspects.—The climate of Sibságar, like that of the rest of the Assam valley, is comparatively mild and temperate. Scarcely a single month passes without some rain, but the year may be roughly divided into two seasons—the dry and cold season, extending from October to the end of April, and the hot and rainy season, occupying the remainder of the year. Dense fogs prevail in the early mornings from November to February. The prevailing direction of the wind is from the north-east, and it seldom rises above the strength of a moderate breeze. The mean annual temperature at Sibságar town for a period of eight years ending 1881 is returned at 73·3° F., ranging from a mean monthly maximum of 83·5° in June to a mean minimum of 58·6° in January. The average annual rainfall for a period of twenty-five years ending 1881 is returned at 94·67 inches, thus distributed—January to May, 29·28 inches; June to September, 58·47 inches; October to December, 6·92 inches.

The prevailing diseases are fevers of a remittent and intermittent type, dysentery and diarrhoea, pulmonic affections, rheumatism, cutaneous disorders, leprosy, elephantiasis, and goitre. Sporadic cases of cholera occur almost every year; and in 1869 this disease made its appearance in an epidemic form from February to June, and is reported to have carried off about 700 persons. Epidemic small-pox breaks out about every fourth or fifth year, being propagated by the practice of inoculation. In 1883, out of a total number of 8655 deaths registered for the rural tracts, 4241 were assigned to fevers, 1851 to bowel complaints, 1112 to cholera, and 225 to small-pox. The total rural mortality was at the rate of 24·02 per thousand for the rural population, and in the three towns of Sibságar, Jorhát, and Golághát at the rate of 24 per thousand. Three charitable dispensaries in the above towns afforded relief to 7701 in-door and out-door patients in 1883–84. Since 1869, a terrible epizootic has been raging among the cattle and buffaloes of the District. It is identified with the rinderpest of Europe, and is supposed to have been introduced from Bengal. The mortality has been very great, about two-thirds of the total number of cattle having been carried off. [For further information regarding Sibságar District, see *The Statistical Account of Assam*, by W. W. Hunter, vol. i. pp. 227–287 (London, Trubner & Co., 1879); *A Descriptive Account of Assam*, by W. Robinson (1841); *Report on the Province of Assam*, by A. J. Moffat Mills (1854); the *Assam Census*

Report for 1881; and the several annual Administration and Departmental Reports of the Assam Government.]

Sibságar.—Sub-division of Sibságar District, Assam, comprising the two police circles (*thánás*) of Sibságar and Bartola. Population (1881) 129,166, residing in 648 villages, and occupying 20,771 houses. Hindus number 118,691; Muhammadans, 6776; and 'others,' 3699.

Sibságar.—Chief town and civil head-quarters of Sibságar District, Assam; situated on the Dikhu river, 9 miles from the south bank of the Brahmaputra, in lat. $26^{\circ} 59' 10''$ N., and long. $94^{\circ} 38' 10''$ E. Population (1881) 5868, namely, Hindus, 4425; Muhammadans, 1351; and Christians, 92. Municipal income (1882-83), £660. Sibságar was one of the capitals of the Aham dynasty, shortly after their conversion to Hinduism. There still exists a magnificent tank, covering an area of 114 acres, with several old temples on its bank. These works are said to have been constructed by Rájá Sib Singh about the year 1722. There are but few houses in the native town which are not in a dilapidated condition. The *bázár*, which runs along both banks of the Dikhu river, has been greatly improved of late years, and contains many iron-roofed houses and several good shops. Large daily market. The public buildings, and the houses of the European residents, are built along the embankment of the tank. Sibságar is the seat of some river trade. The trading community consist chiefly of up-country Mārwarís, who have their head-quarters in Sibságar town, and branch shops at many of the larger tea-gardens. The exports are cotton, rice, and, most important of all, tea; the imports, piece-goods and brass-ware. During the cold season, parties of Nágás from the hills bring down raw cotton and vegetables, to barter for salt, poultry, cattle, and dried fish. During the rainy season, a small steamer plies on the Dikhu river from Dikhumukh to Nazirá, calling at Sibságar.

Siddhápúr.—Sub-division of North Kanara District, Bombay Presidency; situated in the south-east corner of the District. Area, 239 square miles. Population (1872) 34,183; (1881) 35,658, namely, males 20,446, and females 15,212, occupying 5527 houses in 95 villages. Hindus number 34,606; Muhammadans, 827; and 'others,' 225.

Siddhápúr is covered with hills in the west, which in the south-west are thickly wooded, and in the north-west are bare. The valleys among the western hills are generally full of gardens. The centre of the Sub-division is a series of low hills, crossed by rich valleys and many perennial streams. In the east the hills are few, and the country stretches in wide fairly-wooded plains, in parts dotted with sugar-cane and rice fields, the extreme south-east is hilly and thickly wooded, mostly with evergreen forests. The small streams are of great value for garden irrigation. In the west the soil is red, and in the valleys a rich alluvial mould. In the east the soil is red in places, but is not rich.

The chief products are—rice, sugar-cane, Bengal gram (*Cicer arietinum*), *kulthi* (*Dolichos biflorus*), areca-nuts, pepper, cardamoms, betel-leaves, lemons, and oranges. Except in the west, where fever prevails during the later rains and the cold weather, the Sub-division is fairly healthy, and during the hot months the climate is agreeable. In 1883 the Sub-division contained 2 criminal courts; police circles (*thinds*), 5; regular police, 47 men; village watch (*chaukidars*), 25. Land revenue, £9034.

The forests of the Sahyādris are the best in this region. They consist mostly of fine evergreens, admirable for their girth and height. The Siddhāpur forests have not been worked for profit; trees required locally and for public works are alone felled. The only exception is sandal-wood, which, when fit, is cut by the Forest Department. The felling and carrying charges are about £4 per ton, and the sale price ranges from £48 to £54 per ton. Canes are general property, other products, such as myrobalans and soap-nuts, are gathered by the Forest Department.

Siddhāpur.—Village and head-quarters of Siddhāpur Sub-division, North Kānara District, Bombay Presidency, situated about 20 miles west of Honāwar. Population (1881) 1920. Dispensary and market.

Siddhaur.—*Parganā* in Bara Banki District, Oudh, bounded on the north by Partābganj, on the east by Surajpur, on the south by Haidargarh and Subeha, and on the west by Satrikh *parganās*. Area, 141 square miles, of which 95 square miles are under cultivation. Government land revenue, £11,986. The *parganā* is divided into two sections, north and south. Population (1881) 82,699, namely, Hindus, 70,019; Muhammadans, 12,680, number of villages, 224; houses, 12,177. The tract was originally in the hands of the Bhars, who were expelled by the Muhammadans at the time of the invasion of Sayyid Sālār Masāūd. Sayyids still form a great part of the population. The *parganā* was first formed in the time of Akbar.

Siddhaur.—Town in Bara Banki District, Oudh, and head-quarters of Siddhaur *parganā*; situated 16 miles west of Bara Banki town, in lat. 26° 46' N., and long. 81° 26' 10" E. Population (1881) 3520, namely, Hindus 1811, and Muhammadans 1709. Number of houses, 743. School, registration office, and post-office. The village contains an old Sivaite temple, and a Muhammadan mosque and tomb, in memory of one Kāzi Kutab, at which fairs are held on the occasion of the *Siva-ratri* and the 'Id and Bakr 'Id festivals.

Siddheshwara.—Peak on the eastern frontier of Coorg in the Western Ghāts, 10 miles from Siddhāpur. Lat. 12° 21' N., long. 76° 3' E. This hill guards the pass by which the highlands of Coorg are entered from the east. On the summit stands a temple dedicated to Siva.

Siddheswar.—Village at the foot of the Saraspur range, which forms the boundary between the Districts of Cachar and Sylhet, Assam, on the south or left bank of the Barak river. There is a celebrated Hindu temple here; and about the 18th March an annual fair is held, attended by 3000 persons. At the same time, a religious gathering for bathing takes place on the opposite bank of the river. The place is traditionally stated to have been the abode of the famous *Rishi* Kapilamuni, a fellow-worker of Patanjali, the founder of one of the six systems of Hindu philosophy.

Sidhaut.—*Taluk* or Sub-division of Cuddapah (Kadapa) District, Madras Presidency. Area, 610 square miles. Population (1881) 59,076, namely, males 30,015, and females 29,061, occupying 13,257 houses in 79 villages. Hindus number 55,202; Muhammadans, 3866; and Christians, 8. The soil is divided into red, sandy, and black. To these may be added saline and stony soils. The best land is in the Penner (Ponnaiyar) valley, where water is easily obtained by sinking wells. Little land is cultivated except in the valleys, owing to the hills by which the *Taluk* is cut up. These hills are the Lankamallai, the Mallamakonda, and the Palkonda ranges. In addition to the ordinary grains, the principal products are indigo and cotton. The north-west line of the Madras Railway traverses the southern portion of the *Taluk*. In 1883 the *Taluk* contained 3 criminal courts; police circles (*thanas*), 5; regular police, 49 men. Land revenue, £10,007.

Sidhaut (Siddhaur).—Town and head-quarters of Sidhaut *Taluk*, Cuddapah (Kadapa) District, Madras Presidency; situated on the Penner (Pennir or Ponnaiyar) river, in lat. $14^{\circ} 27' 56''$ N., and long. $79^{\circ} 0' 40''$ E. Population (1881) 3816, residing in 784 houses. The town formerly belonged to Chitwail State, and later to the Pathins of Cuddapah; it was taken by Haidar Ali in 1779. In early British times it was the capital of the District, and is now the head-quarters of a Deputy Collector and Magistrate. Sidhaut is a place of some importance and of considerable sanctity. Owing to fancied resemblance in its position on the Penner, and to the relative position of some neighbouring villages and rivers, it is sometimes known as *Dakshina Kasi*, or the 'Southern Benares.' It is notable for its melons.

Sidhpur.—Town in Baroda State, Gujarat, Bombay; situated on the Saravati river, in lat. $23^{\circ} 55' 30''$ N., long. $72^{\circ} 26'$ E. Population (1872) 3534. Sidhpur is a very old town, and a place of Hindu pilgrimage.

Sidlaghata (Siddagatta).—*Taluk* in Kolar District, Mysore State. Area, 163 square miles, of which 78 are cultivated. Population (1871) 91,849. (1881) 60,807, namely, males 29,798, and females 31,009.

Hindus number 58,885; Muhammadans, 1839; and Christians, 83. Land revenue (1883), exclusive of water rates, £11,810. Forms the upper valley of the Pápaghni river. In 1883 the *tilluk* contained 1 criminal court, police circles (*thánis*), 6; regular police, 54 men; village watch (*chaukidárs*), 591.

Sidlaghata.—Town and municipality in Kolár District, Mysore State; situated in lat. 13° 23' 40" N, and long. 77° 54' 41" E, 30 miles north-west of Kolár town. Head-quarters of the Sidlaghata *tilluk*. Population (1881) 5804, namely, Hindus, 5062; Muhammadans, 740; and Christians, 2. Said to have been founded in 1524 by Sivangi Gauda, a freebooter, whose family extended their power, and held the place for 87 years. Afterwards it passed successively through the hands of the Maráthas, the Mughals, and the *allegár* of Chik-ballapur.

Sidli.—One of the Dwárs or submontane tracts forming the Eastern Dwárs of Goalpára District, Assam. Area, 361 square miles; reserved forest area, 68 square miles, including several valuable forests of *sál* timber; cultivated area, 41·77 square miles. Population (1881) 23,657. Sidli, like the rest of the Dwár tract, was ceded to the British at the close of the Bhután war of 1864–65. In 1870, a settlement for seven years was made with the Rájá at a land revenue of £1939; but this amount was never actually collected, and the estate was forthwith, at the Rájá's request, placed under the Court of Wards, under whose management it has continued ever since. In 1877, when the first settlement expired, a change was introduced in the system of management. The tract was divided into five *mauzás* or village circles, each placed under a *mauzáddár*, who collects the rents direct from the cultivators, to whom annual leases are given for the land they actually cultivate, as in the Assam valley. Twenty per cent. of the net collections are made over to the Rájá Gaurnárájan Deb. In 1881–82 the net receipts amounted to £3531.

Sígúr Ghát, the corrected spelling for SEGHUR (*q.v.*).—Mountain pass in the Nilgiri Hills, Madras Presidency.

Sihonda.—Ancient and decayed town in Bánda District, North-Western Provinces; situated near the right bank of the Ken river, a short distance to the right of the Bánda-Kálinjar road; distant from Bánda town 11 miles south. Population (1881) 1277, chiefly Muhammadans. Local tradition declares that the town possessed great importance during the heroic period; but the remains belong chiefly or entirely to Muhammadan times. Capital of an important Division under the Mughals. In 1630 A.D., the rebel Khán Jahán fell at this place in battle against the imperial troops. Sihonda has been gradually declining since the days of Aurangzeb. It is said to have once contained 700 mosques and 900 wells; all the former have disappeared except 4, and most of the latter are now choked up.

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Ruins of a large fort on a neighbouring hill; a temple to Devī Angaleswari crowns another height near the town. Village school. Sihonda was formerly the head-quarters of a *tahsil*, which after the Mutiny was removed to the neighbouring village of Girwān.

Sihor.—Town in Bhaunagar State, Kāthiāwār, Bombay Presidency; situated in lat. $21^{\circ} 42'$ N., and long. $72^{\circ} 1' 45''$ E., about 13 miles west of Bhaunagar town, on the slope of the Sihor range of hills. Called in former times Singhpur or Singhpurī, 'the lion city.' A still more ancient name is Sāraswatpur. It formed the capital of the Bhaunagar branch of the Gohel Rājputs until Bhaunagar town was founded. The old site of the city is about half a mile to the south. Population (1881) 9528, namely, Hindus, 7511; Muhammiadans, 1249; Jains, 764; and Pārsis, 4. Sihor is famous for its brass and copper work, snuff, and mortar (*chunām*). The dyers are numerous and skilful, and dye women's scarves (*saddīs*) with various colours, but they are especially famous for their chocolate dye. Sihor is also a great place for oil-pressers. Two boys' and one girls' school. Station on the Bhaunagar-Gondal Railway.

Sihor.—Town in Bhopāl State, Central India.—See SEHORE.

Sihorā.—Petty State in Rewā Kānthā, Bombay Presidency. Area, $15\frac{1}{2}$ square miles. The State is watered by the Mahi, Mesri, and Goma rivers. Furrowed by ravines; and much of the land near the river covered with brushwood. The cultivated parts are rich, yielding cotton, rice, millet, and gram. The chief is named Suda Parmar Nar Singhji. Estimated revenue, £1400; of which £480 is paid as tribute to the Gāekwār of Baroda.

Sihorā.—Central *tahsil* or Sub-division of Jabalpur (Jubbulpore) District, Central Provinces. Area, 1197 square miles; number of towns and villages, 725; houses, 51,772. Population (1881) 192,722, namely, males 96,387, and females 96,335; average density of population, 161 persons per square mile. Of the total area of the *tahsil*, 111 square miles are held revenue-free, leaving the assessed area at 1086 square miles. Of these, 526 square miles are returned as under cultivation, 265 square miles as cultivable but not under tillage, and 295 square miles as uncultivable waste. The total adult agricultural population (male and female) was returned in 1881 at 69,296, or 35.96 per cent. of the whole population of the *tahsil*. Average area of cultivated and cultivable land available for each adult agriculturist, 7 acres. Total Government land revenue, including local rates and cesses levied on the land, £19,754, or 1s. $2\frac{1}{2}$ d. per cultivated acre. Total rental, including cesses, paid by the cultivator, £57,737, or 2s. $4\frac{3}{4}$ d. per cultivated acre. In 1883 the *tahsil* contained 1 criminal and 2 civil courts, 3 police circles (*thānds*), and 4 outpost stations (*chaukīs*); regular police, 79 men; rural police (*chaukīdārs*), 476.

Sihorá.—Town and municipality in Jabalpur (Jubbulpore) District, Central Provinces, and head-quarters of Sihorá *tahsil*; situated in lat. $23^{\circ} 29' N.$, and long. $80^{\circ} 9' E.$, 27 miles from Jabalpur city, on the road to Mirzāpur, 4 miles north of the Hiran river, and $2\frac{1}{2}$ miles from Sihorá station on the Jabalpur extension of the East Indian Railway. Population (1881) 5736, namely, Hindus, 4820; Muhammadans, 783; Jains, 119; and 'others,' 14. Municipal income (1882-83), £258, of which £237 was derived from taxation; average incidence of taxation, 9½d. per head. Sihorá does a brisk trade in grain and country produce.

Sihorá (Tirorá).—Town in Bhandārá District, Central Provinces; situated in lat. $21^{\circ} 24' N.$, and long. $79^{\circ} 58' E.$, 30 miles north-east of Bhandārá town. Population (1881) 2781, namely, Hindus, 2476; Muhammadans, 200; Káshīpanthís, 82; Jains, 2; non-Hindu aborigines, 21. Cotton cloth of inferior quality is manufactured. A large tank, south of the town, always contains water. Government school and police outpost.

Sijakpur.—Petty State in the Jhálāwár division of Káthiāwár, Bombay Presidency.—*See* SEJAKPUR.

Sijauli.—Village in Kora *tahsil*, Fatehpur District; situated in lat. $25^{\circ} 59' 28'' N.$, long. $80^{\circ} 30' 45'' E.$ Population (1881) 2807; prevailing caste, Rájput.

Sijáwal.—*Taluk* of Lárkhána Sub-division, Shikárpur, Sind, Bombay Presidency. Area, 192 square miles. Population (1881) 18,362, namely, males 10,003, and females 8359, occupying 2495 houses in 86 villages. Muhammadans number 16,666; Sikhs, 904; and Hindus, 792. In 1882-83, the area assessed for land revenue was 65,875 acres. Area under actual cultivation, 31,616 acres. Revenue, £6382.

Siju.—Village in the Gáro Hills District, Assam, on the Sameswarí river, with a considerable population engaged in fishing. In the neighbourhood are coal mines, which were at one time worked by the Mahárájá of Susáng. Several curious caverns are situated in the limestone formation of the Sameswarí river. The largest of these is in the neighbourhood of Siju village. The entrance is about 20 feet high, with a spacious dome-shaped chamber within. A small stream trickles through the cave, which has been explored for a whole day without the stream having been traced to its source. The cave is filled with swarms of bats.

Sikandarábád (Secunderábád).—North-western *tahsil* of Bulandshahr District, North-Western Provinces; comprising the three *parganá*s of Sikandarábád, Dádri, and Dankaur; stretching inland from the east bank of the Jumna (Jamuná), and watered by two branches of the Ganges Canal. The East Indian Railway traverses the *tahsil* from end to end, with two stations (at Sikandarábád and Dádri). Area of

tahsíl, 524 square miles, of which 370 are cultivated. Population (1881) 236,066, namely, males 127,442, and females 108,624. Hindus number 196,932; Muhammadans, 38,612; Jains, 495; and 'others,' 27. Of the 415 towns and villages, 248 contain less than five hundred inhabitants; 124 between five hundred and a thousand; 41 between one thousand and five thousand; and 2 upwards of five thousand inhabitants. Land revenue (1872), £28,996; total Government revenue, £32,173; rental paid by cultivators, £76,132. In 1883 the *tahsíl* contained 2 criminal courts; number of police circles (*thánás*), 8; strength of regular police, 91 men; village watch or rural police (*chaukidárs*), 638.

Sikandarábád (*Secunderábád*).—Town and municipality in Bulandshahr District, North-Western Provinces, and head-quarters of Sikandarábád *tahsíl*. Situated on the Delhi branch of the Grand Trunk Road, in lat. 28° 27' 10" N., and long. 77° 44' 40" E., 10 miles east of Bulandshahr town; the station on the East Indian Railway is 4 miles south of the town. Population (1881) 16,479, namely, males 8702, and females 7777. Hindus, 10,094; Muhammadans, 6050; Jains, 320; and 'others,' 15. Municipal income (1883-84), £1105, of which £912 was derived from taxation; average incidence of taxation, 1s. 1½d. per head. Two good *bázárs*, the centre of the local trade in cotton, sugar, and grain. Founded by Sikandar Lodi in 1498; head-quarters of a *mahál* under Akbar; centre of the fief of Najfb-ud-daulá. Saádat Khán, Viceroy of Oudh, attacked and defeated the Maráthá force here in 1736. The Ját army of Bhartpur encamped at Sikandarábád in 1764, but fled across the Jumna (Jamuná) on the death of Suráj Mall and defeat of Jawáhir Singh. Station of Perron's brigade under the Maráthás. Occupied by Colonel James Skinner after the battle of Aligarh. During the Mutiny of 1857, the neighbouring Gújars, Rájputs, and Muhammadans attacked and plundered Sikandarábád; but Colonel Greathed's column relieved the town on September 27th, 1857. *Tahsili* and police station; charitable dispensary; vernacular school. Several small mosques and temples. Residence of Munshí Lakshman Sarúp, a large landholder and honorary magistrate. Manufacture of fine muslins for turbans, scarves, and native dresses.

Sikandarábád.—Town and cantonment in the Nizám's Dominions.—See SECUNDERABAD.

Sikandarpur.—*Parganá* in Unao *tahsíl*, Unao District, Oudh, bounded on the north by Pariar, on the east by Unao, on the south by Harha, and on the west by Cawnpur District in the North-Western Provinces. Area, 58½ square miles, or 37,453 acres. Population (1881) 31,416, namely, males 14,923, and females 16,493. Chief products, barley and sugar-cane. Government land revenue, £5807, or an

average assessment of 3s. 1½d. per acre. The *parḡand* comprises 51 villages, of which 48 are in the hands of Purihar Rājputs. The history of this clan is thus described in Mr. Elliott's *Chronicles of Unao*, pp. 58-60:—

‘The present Purihars in Unao District inhabit the *parḡand* of Sarosi, or, as it has recently become habitual to call it, Sikandarpur. According to their own traditions, they came from a place called Jigini (which is not to be found on the map), or Srinagar, *i.e.* Kashmir. From that high hill country they were driven—we know not by what cause—to inhabit the sandy plains of Mārṡār. Expelled thence, they were broken into innumerable little principalities, which found no abiding place, and have undergone continual changes, till we meet with a small portion of the clan who settled, comparatively a short time ago, in a little corner of Oudh; and even here the name of the beautiful valley from which they came ten centuries ago is still common in the mouths of men.

‘The story of the settling of the ancestors of the clan in Sarosi is thus told. About three hundred years ago, in the time of Humāyūn, Emperor of Delhi, a Dikhit girl from Purenda was married to the son of the Purihar Rāja, who lived at Jigini, across the Jumna. The bridegroom came with a large escort of his friends and brotherhood to celebrate the marriage, and the party on their journey passed through Sarosi. As they sat down around a well (the site of which is still shown), they asked who were the lords of the fort which stood not far off. They were told that the fort was held by Dhobis (washermen) and other Sūdras who owned the neighbouring country. The procession then went on to Purenda, and returning, conducted the bride to her home. Just before the *Holi* festival, a party, headed by Bhagē Singh, returned, waited for the evening of that riotous feast, and then, when the guards of the fort were heavy with wine, and no danger was looked for, suddenly attacked and slaughtered them, and made themselves masters of the fort and the surrounding country.

‘Bhagē Singh had four sons, and they divided the eighty-four villages he had conquered at his death. Asis and Salhu, the two eldest sons, took the largest portion of the estate—twenty villages falling to the former, and forty-two to the latter. The third son, Manik, was a devotee, and refused to be troubled with worldly affairs. All he asked for was one village on the banks of the Ganges, where he might spend his life in worship, and wash away his sins three times a day in the holy stream. The youngest son, Bhuledhān, was quite a boy at the time of his father's death, and took what share his brothers chose to give him; and they do not seem to have treated him badly.

‘The law of primogeniture did not exist among the family. Every son, as he grew up and married, claimed his right to a separate share of his father's inheritance; and thus the ancestral estate constantly

dwindled as fresh slices were cut off it, till at last the whole family were a set of impoverished gentlemen, who kept up none of the dignity which had belonged to the first conquerors, Bhagé Singh and his sons. For six generations they stagnated thus, no important event marking their history till the time of Hira Singh. The family property in his time had grown very small, and he had five sons to divide it amongst; and, to add to his misfortunes, he was accused of some crime, thrown into prison at Faizábád, and loaded with chains. With the chains on his legs he escaped, arrived safely at Sarosi, and lay in hiding there. His pride being thus broken, he resolved to send his third son, Kalandar Singh, to take service in the Company's army. He rose to be Subahdár Major in the 49th Regiment of Native Infantry; and in this position, through his supposed influence with the Resident, became a very considerable man. He knew that as long as he was at hand, no *chakladár* or governor would venture to treat the Purihar *zamíndárs* with injustice; but on his death they would be again at the mercy of the local authorities. He therefore collected all the members of the brotherhood who were descended from Asis, and persuaded them to mass their divided holdings nominally into one large estate, of which his nephew Ghuláb Singh should be the representative *tdlukdár*; so that while in reality each small shareholder retained sole possession of his own share, they should present the appearance of a powerful and united *tdluk*, making Ghulab Singh their nominal head. Thus the *chakladárs* would be afraid to touch a man who seemed to hold so large an estate, though in reality he only enjoyed a small portion of it. The brotherhood consented to this; and from 1840 till the British annexation the estate was held in the name of Ghuláb Singh alone, and they had no further trouble from the oppressions of the *chakladárs*.

Sikandarpur.—Town in Bánsdih *tahsil*, Ballia District, North-Western Provinces; situated in lat. 26° 02' 18" N., and long. 84° 05' 45" E., 2 miles from the right bank of the Gogra, 14 miles from Bánsdih, and 24 miles from Ballia town. Population (1881) 7027, namely, Hindus 4349, and Muhammadans 2678. The town was founded in the 15th century, during the reign of Sikandar Lodi of Jaunpur, after whom it was named. Its former importance is attested by the ruins of a large fort, and of houses extending over a large area. Its decadence is locally ascribed to the wholesale migration of the inhabitants to Patná, but nothing is known as to the cause or even the date of this abandonment. The local market is still famous for its *atar* of roses and other essences, of which there is a considerable export to Bengal. Police station, post-office, and middle-class school. For police and conservancy purposes, a small house-tax is raised, which realized £86 in 1881-82.

Sikandra.—Village in Agra *tahsil*, Agra District, North-Western

Provinces; situated in lat. $27^{\circ} 12' 59''$ N., and long. $77^{\circ} 59' 34''$ E., 5 miles north-west of Agra city, on the Muttra road. Population (1881) 1745. Founded by Sikandar Lodi of Jaunpur, who built a palace here in 1495, but now chiefly noticeable as containing the tomb of Akbar, commenced by that monarch, and finished by his son Jahāngir in 1613. Fergusson describes the mausoleum as the most characteristic of Akbar's buildings. It is quite unlike any other tomb in India erected before or since, and the design is believed by Fergusson to be borrowed from a Hindu, or, more correctly, a Buddhist model. It is surrounded by an extensive garden of 150 acres, still kept in order, and is approached on each side by archways of red sandstone, the principal gateway being of magnificent proportions.

'In the centre of this garden, on a raised platform, stands the tomb itself, of a pyramidal form. The lower terrace measures 320 feet each way, exclusive of the angle towers. It is 30 feet in height, and pierced by ten great arches on each face, and with a larger entrance, adorned with a mosaic of marble in the centre.

'On this terrace stands another far more ornate, measuring 186 feet on each side, and 14 feet 9 inches in height. A third and fourth, of similar design, and respectively 15 feet 2 inches and 14 feet 6 inches high, stand on this; all these being of red sandstone. Within and above the last is a white marble enclosure, 157 feet each way, or externally just half the length of the lowest terrace, its outer wall entirely composed of marble trellis-work of the most beautiful patterns. Inside, it is surrounded by a colonnade or cloister of the same material, in the centre of which, on a raised platform, is the tombstone of the founder a splendid piece of the most beautiful Arabesque tracery. This, however, is not the true burial-place, but the mortal remains of the great king repose under a far plainer tombstone in a vaulted chamber in the basement, 35 feet square, exactly under the simulated tomb that adorns the summit of the mausoleum.

'The total height of the building now is a little more than 100 feet to the top of the angle pavilions, and a central dome, 30 or 40 feet higher, which is the proportion that the base gives, seems just what is wanted to make this tomb as beautiful in outline and in proportion as it is in detail. Had it been so completed, it certainly would have ranked next to the Tāj among Indian mausolea.'

An asylum was established at Sikandra in 1837-38, for the orphans whose parents had perished in the terrible famine of that year. The orphanage is still maintained by the Church Mission Society.

Sikandra.—Village in Phūlpur *tahsil*, Allahābād District, North-Western Provinces, situated in lat. $25^{\circ} 35' 15''$ N., long. $82^{\circ} 1' 6''$ E. Population (1881) 2005. About a mile north-west of the village is the tomb of Mahmūd of Ghazni's famous general Sayyid Salār Masādd, at

which a fair is held every May, attended by about 50,000 Muhammadan pilgrims.

Sikandra Rao.—South-eastern *tahsil* of Aligarh District, North-Western Provinces; comprising the *parganas* of Sikandra and Akardabad, and consisting chiefly of a fertile upland plain, watered in every direction by distributaries of the Ganges Canal. Area, 342 square miles, of which 233 are cultivated. Population (1881) 175,873, namely, males 96,099, and females 79,774. Hindus, 155,890; Muhammadans, 19,616; Jains, 366; 'others,' 1. Of the 245 villages in the *tahsil*, 140 contain less than five hundred inhabitants; 62 between five hundred and a thousand; 42 between one and five thousand; and 1 upwards of ten thousand inhabitants. Land revenue at the time of the last Settlement Report, £3873, or including local rates and cesses levied on land, £4260. In 1884 the *tahsil* contained 1 criminal court, with 4 police circles (*thānis*); strength of regular police, 74 men; rural police or village watch (*chaukidars*), 356.

Sikandra Rao.—Town and municipality in Aligarh District, North-Western Provinces, and head-quarters of Sikandra Rao *tahsil*; situated in lat. 27° 41' 10" N., and long. 78° 25' 15" E., on the Cawnpur road, 23 miles south-east of Koil. Population (1881) 10,193, namely, males 5109, and females 5084. Hindus number 5552; Muhammadans, 4606; and Jains, 35. Municipal income (1883-84), £791, of which £739 was derived from octroi; average incidence of taxation, 1s. 2½d. per head of population (12,171) within municipal limits. Sikandra Rao is a squalid, poor-looking town, on a low, badly-drained site. A great swamp spreads eastward, attaining a length of 4 miles during the rains. Founded in the 15th century by Sikandra Lodi, and afterwards given in *jizir* to Rao Khan, an Afghan, from which circumstances the town derives its compound name. During the Mutiny of 1857, Ghaus Khan of Sikandra Rao was one of the leading rebels, and held Koil as deputy for Walidad Khan of Maligarh. Kundan Singh, a Pundit Rajput, did good service on the British side, and held the *pargana* as Nazim. Mosque dating from Akbar's time; ruined house in the town, once the residence of the Muhammadan governor. *Tahsil*, police station, post-office, school, dispensary.

Sikar.—Town and chiefship in the Shaikhawati district of Jaipur State, Rajputana. Population (1881) 17,739, namely, males 9418, and females 8321. Hindus number 11,890; Muhammadans, 5117; and 'others,' 732. Sikar chiefship is a feudatory of Jaipur, and pays a tribute of £4000 a year. Estimated revenue, £80,000. The town is fortified, and is distant 72 miles north-west from Jaipur city. Post-office.

Sikhar.—Town and fort in Benares District, North-Western Provinces; situated on the left bank of the Ganges, nearly opposite

Chunár, in lat. $25^{\circ} 8' N.$, and long. $82^{\circ} 53' E.$ Garrisoned in 1781 by the rebellious Rájá Cháit Singh, but stormed by the British under Lieutenant Polhill.

Sikkim.—Native State in the Eastern Himálaya Mountains; bounded on the north and north-east by Tibet, on the south-east by Bhután, on the south by the British District of Dárjiling, and on the west by Nepál. Situated between $27^{\circ} 9'$ and $27^{\circ} 58' N.$ lat., and between $88^{\circ} 4'$ and $89^{\circ} E.$ long.; covering an area of about 1550 square miles, with an estimated population of 7000. The capital is Tumlong, where the Rájá resides during the winter and spring, usually going to his estates at Chumbi in Tibet in summer to avoid the heavy rains of Sikkim. The Tibetan name for Sikkim is *Dingjing* or *Demojong*, and for the people *Deunjong Mars*, the Gúrkha name for the people of Sikkim (which has been adopted by English writers) is *Lepcha*; but they call themselves *Rong*, according to Mr. Clements Markham.

Physical Aspects.—The whole of Sikkim is situated at a considerable elevation within the Himálayan mountain-zone. Between Dárjiling and Tumlong the mountains are generally lower than those of Dárjiling itself. North of Tumlong, the passes into Tibet have been recently visited by Mr. Blanford and Mr. Edgar, and found to be of great height. The most southerly of these passes (as described by Mr. Markham, in the introduction to his *Tibet*, second edition, 1879) is that of Jeylep-la, about 50 miles beyond Tumlong, 13,000 feet above sea-level. The two next to the north are those of Guatula and Yak-la, the latter 14,000 feet high. These, Mr. Markham says, are rarely interrupted by snow for many days, and form the easiest route into the Chumbi valley of Tibet. Farther to the north is the Cho-la Pass, 15,000 feet high, on the direct road from Tumlong to Chumbi. The Yak-la, Cho-la and Jeylep-la Passes cross the lofty spur of the Himálayas separating the Chumbi and Tista valleys. Then comes the Tankra-la Pass, 16,083 feet high, the most snowy pass in Sikkim.

Sikkim is drained by the river TISTA, and its affluents the Lachen, the Lachung, the Búri Ranjít, the Moing, the Rangri, and the Rangchu. The Am-machu rises near Parijong, at the foot of the Chamalhari Peak (23,929 feet), and flows through the Chumbi valley, which is a strip of Tibetan territory separating Sikkim from Bhután. In this lower part of its course, the Am-machu passes into the British District of Jalpáiguri, under the name of the TORSIA. The rivers of Sikkim generally run in very deep ravines between the mountains; and the ascent from the bank, for the first thousand feet, is almost precipitous. All the rivers are very rapid. According to Dr. Hooker's measurement, the Ranjít, in a course of 23 miles, between the *ghát* above the Kulhait river and that at the cane-bridge below Dárjiling, falls 987 feet; whilst

the Tista falls 821 feet in about 10 miles, and flows in places at the rate of 14 miles an hour.

Near Mintugong are some copper mines, worked by Nepálese. Mr. Edgar (*Report on a Visit to Sikkim and the Tibetan Frontier*, 1874, p. 84) found that the Bhutiá population are superstitiously averse to any search for metals below the earth's surface; and consequently little is known of the mineral resources of the country. Mr. Edgar, however, was of opinion that every mine is abandoned long before the vein of ore has been exhausted.

The valleys and slopes of this mountainous land are clothed with dense jungle, the vegetation in which varies, according to the elevation, from the cotton, banian, fig, and other tropical trees, which are found in the lower zones, to the fir, rhododendron, and dwarf bamboo, which appear above the level of 10,000 feet. The bamboo grows to enormous size, often attaining a diameter of 7 to 9 inches. The canes used in the construction of the well-known Himálayan cane-bridges grow principally in the bamboo jungles. The cane is found of the diameter of $1\frac{1}{2}$ to 2 inches; and a single piece was once traced through the jungle by Colonel Gawler (*Sikkim; Mountain and Jungle Warfare*, 1873, p. 13) for a distance of 80 yards without finding the end.

The wild animals are the same as those found in the jungles of DARJILING. Travellers in Sikkim suffer greatly from the *pípsa*, and from the leeches which abound everywhere. Colonel Gawler writes of them: 'The jungles are infested with leeches, which penetrate loosely woven clothes, and deprive the wearer of a good deal of blood before he finds them out. They get far up the noses of horses, goats, etc., and cannot be removed without subjecting the poor animal to a couple of days without water, which, being afterwards offered to him, the leeches also want to drink, and may be seized. If the leeches are allowed to remain, the animals become reduced to a skeleton.'

History.—Sikkim was known to early European travellers, such as Horace della Penna and Samuel Van de Putte, under the name of *Bramashon* (see Markham's *Tibet*, p. 64); whilst Bogle called it *Dcmojong*. Local traditions assert that the ancestors of the Rájás of Sikkim originally came from the neighbourhood of Lhasa in Tibet, and settled at Gantak. About the middle of the 16th century, the head of the family was named Pencho Namgay; and to him repaired three Tibetan monks, professors of the *Dupka* (or 'Red Cap') sect of Buddhism, who were disgusted at the predominance of the *Galukpa* sect in Tibet. These Lamas, according to Mr. Edgar's *Report*, succeeded in converting the Lepchas of Sikkim to their own faith, and in making Pencho Namgay Rájá of the land. The *avatárs* of two of these Lamas are now the heads, respectively, of the great monasteries of Pemiongchi and Tassiding. In 1788 the Gúrkhas invaded

Sikkim, in the governorship of the Morang, and only retired, in 1789, on the Tibetan Government ceding to them a piece of territory at the head of the Koti Pass. But in 1792, on a second invasion of Tibetan territory by the Gúrkhas, an immense Chinese army advanced to the support of the Tibetans, defeated the Gúrkhas, and dictated terms to them almost at the gates of Khatmandu.

On the breaking out of the Nepál war in 1814, Major Latter, at the head of a British force, occupied the Morang, and formed an alliance with the Rájá of Sikkim, who gladly seized the opportunity of revenging himself on the Gúrkhas. At the close of the war, in 1816, the Rájá was rewarded by a considerable accession of territory, which had been ceded to the British by Nepál, and by the usual guarantee of protection. In February 1835, the Rájá ceded Dárjiling to the British, and received a pension of £300 per annum in acknowledgment thereof.

There was, however a standing cause of quarrel between the Rájá and the paramount power, due to the prevalence of slavery in Sikkim: the Rájá's subjects were inveterate kidnappers, and the Rájá himself was most anxious to obtain from the British authorities the restoration of runaway slaves. With some absurd notion of enforcing the latter demand, two gentlemen (Dr. Campbell, the Superintendent of Dárjiling, and Dr. Hooker, the famous naturalist) were seized in 1849, whilst travelling in Sikkim, and detained for six weeks. As a punishment for this outrage, the Rájá's pension was stopped, and a piece of territory, including the lower course of the Tista and the Sikkim *tardí*, was annexed. The practice, however, of kidnapping Bengálí subjects of the British Crown was not discontinued; and two specially gross cases, in 1860, led to an order from Calcutta, that the Sikkim territory, north of the Ramnán river and west of the Búrí Ranjít, should be occupied until restitution was made. Colonel Gawler, at the head of a British force, with the Hon. Ashley Eden as envoy, advanced into Sikkim, and proceeded to Tumlong, when the Rájá was forced to make full restitution, and to sign another treaty, in March 1861, which secured the rights of free trade, of protection for travellers, and of road-making.

Since the ratification of this treaty, relations with Sikkim have been uniformly friendly, and the country has been repeatedly explored by travellers, who have followed in the footsteps of Dr. Hooker. In 1873, the Rájá of Sikkim, accompanied by his brother and minister, Changzed Rabu (a man of great abilities and predominating influence), and other members of his family, paid a visit to the Lieutenant-Governor of Bengal at Dárjiling; and in the following winter, Mr. Edgar, C.S.L., returned the Rájá's visit, as the representative of the Bengal Government, and obtained the materials for the valuable *Report* quoted above.

Population, &c.—The population of Sikkim was estimated by Dr. Campbell at 7000; of whom about 3000 are Lepchas, 2000 Bhutias,

and 1000 Limbus. Eastward of the Tista, Colonel Gawler found some Tibetans. The Buddhist monks—each monastery under its own head Lama—form a numerous and influential section of the population. The chief villages are Tumlong (the capital) and Gantak; the chief monasteries are those of Labrong near Tumlong, Pemiongchi, and Tassiding. The head of the Labrong monastery is called the Kupgain Lama; and Mr. Edgar states that he is also the superior of Pemiongchi, and of nearly two-thirds of the monasteries of Sikkim. On the Tumlong Hill, besides the Rājā's palace, there are a number of other substantially built houses belonging to the various officials of the State. Each house is surrounded by some cultivated land, in which are generally a few clumps of bamboos or fruit-trees. During the rainy season, many of these houses are vacant, the officials being absent with the Rājā at Chumbi in Tibet. The house of the Kāzi at Gantak is described as 'a very ornamental building of wattle and dab, raised on stout posts.'

Agriculture, Land Tenures, and Revenue System.—The chief cultivated crops in the valleys and in the clearings on the hills of Sikkim are wheat, buckwheat, barley, *marai*, maize, and a little rice; but no more grain is grown than suffices for local consumption. Cardamoms and oil-seeds are cultivated in the low valleys in the extreme west of the State. Plantains, oranges, and other fruits are grown in the gardens. Cattle and ponies are imported from Tibet. Between Pemiongchi and the little Ranjit, there is a curious tract of level country, described by Mr. Edgar as a great even ledge, several square miles in extent, with hills rising abruptly from it on three sides, whilst on the fourth side there is a precipitous fall of many hundred feet. The soil of this plain is exceedingly rich, as it catches all the silt of the upper hills; and every inch of it is highly cultivated, chiefly with cardamoms, oil-seeds, and other valuable crops.

Mr. Edgar gives the following interesting account of the revenue system and land tenures:—

'There are twelve Kāzis in Sikkim, and several other officers with various names exercise jurisdiction over specific tracts of land. Each of these officers assesses the revenue payable by all the people settled on the lands within his jurisdiction, and, as far as I can make out, keeps the greater portion for himself, paying over to the Rājā a certain fixed contribution. At the same time, he has no proprietary right in the lands, though the Kāzis have at least a kind of hereditary title to their office. The Kāzis and other officers exercise limited civil and criminal jurisdiction within the lands the revenue of which they collect, all important cases being referred to the Rājā, and decided by Changzed (the minister) and the Diwans, who are at present three in number. The cultivators have no title to the soil, and a man can settle down

and cultivate any land he may find unoccupied without any formality whatever; and when once he has occupied the land, no one but the Rájá can turn him out. But the Rájá can eject him at any time; and if he should cease to occupy the land, he would not retain any lien upon it. There is a kind of tenant-right, however, under which cultivators are enabled to dispose of unexhausted improvements. Thus, as it was explained to me, a man who has terraced a piece of hillside could not sell the land, but is allowed to sell the right of using the terraces. This custom is acknowledged not to be absolutely a right, but more of the nature of an indulgence on the part of the Rájá, by whom it was allowed to grow up for the sake of convenience.

'The land is not assessed, and pays no revenue. The assessment is on the revenue-payer personally. I think that in theory he is allowed the use of the Rájá's land in order that he may live and be able to render to the Rájá the services which he is bound to perform as the Rájá's live chattel; and possibly if the system were carried to theoretical perfection, he would be bound to give over to the Rájá all the net produce of the land—that is, all the fruit of his labour beyond what might be actually necessary to support himself and his family. In practice, the subject is only bound to give a certain portion of his labour, or of the fruit of his labour, to the State; and when he does not give actual service, the amount of his property is roughly assessed, and his contribution to the State fixed accordingly; but such assessment is made without the slightest reference to the amount of land occupied by the subject. The value of his wives and children, slaves, cattle, furniture, etc., are all taken into account, but not the extent of his fields.'

The Lamas are not bound to labour for the Rájá, and they pay no dues of any kind, no matter how much land may be cultivated by themselves or their bondsmen.

Commerce, etc.—There are several trade routes through Sikkim, from the British District of Dárjiling into Tibet; but owing partly to the natural difficulties of the country, and partly to the jealousy of the Tibetans, these are not much used. At Rangpo-tang, on the Tista, and at other points, there are good cane-bridges, and in some places there are raft-ferries; but all roads are mere hill bridle-paths, and communication is exceedingly imperfect and difficult. The *Report* of the British envoy in 1861 stated that a considerable trade between Bengal and Tibet would be the almost certain result of improved communications through Sikkim; the Tibetans exporting gold, silver, ponies, musk, borax, wool, turquoises, silk, and *manjit* or madder, in exchange for broadcloth, bleached goods, tobacco, and pearls. In addition to this transit trade, Sikkim supplies ponies, sheep, and jungle produce to the British territory of Dárjiling, and imports therefrom some British manufactures, tobacco, etc. A registration station has

been established at Ranjit. In 1876-77, the total exports from Sikkim into Darjiling were valued at £80,265, of which timber alone represented £70,870; the total imports were valued at £14,164, chiefly indigo (£6600), cattle (£2322), metals (£1773), piece-goods (£1357), tobacco (£967). In 1883-84, the total exports from Sikkim into Bengal had fallen to £2215; and the total imports from Bengal into Sikkim to £1127.

Climate and Medical Aspects.—The ranges between Darjiling and Tumlong are lower than Darjiling itself, and generally less cool; whilst the deep narrow valleys of most of the rivers have a hot and stifling climate, notorious for its malaria and jungle-fever. The rainfall, like that of Darjiling, is very heavy. There is usually a little dulness, and perhaps rain, late in December and early in January; after which the weather remains bright and clear until May, when storms, growing more and more frequent, usher in the rainy season, which lasts till October.

Sikrol (Siv).—Western suburb of BENARES CITY, containing the military cantonments, civil station, and European quarter. Lat. 25° 20' 20" N., long. 83° 1' 20" E. The little river Barná flows through the suburb, dividing it into two parts. Church, official buildings, numerous well-built bungalows, standing amid gardens and groves.

Silái.—River of Bengal; rises in the Fiscal Division of Ládðurká, Mánbhúm District, and flows in a south-easterly direction into the District of Midnapur. After a tortuous course it falls into the RUPNARAYAN, of which it forms the chief tributary, near the point where that river touches the eastern boundary of Midnapur. The Silái is subject to destructive floods; it is only navigable throughout the year for a short distance in its lower reaches, which are within tidal influence. It is fed by two small streams from Bánkura District, on the north—the Purandhar-nadí and Gopa-nadí. The other and principal feeder of the Silái is the Burí-nadí, which takes its rise in the north-west of Midnapur District, and flows east into the Silái near Nárdjol.

Silána.—Petty State in the Soráth *prant* or division of Káthiawár, Bombay Presidency; consisting of 1 village, with 2 shareholders, or tribute-payers. Area, 4 square miles. Population (1881) 691. Estimated revenue, £300; of which £10 is paid as tribute to the Gáekwár of Baroda.

Silánáth.—Village in Darbhanga District, Bengal; situated on the Kamli river, in lat. 26° 34' 30" N., and long. 86° 9' 45" E. Population (1872) 2520. Not returned separately in the Census Report of 1881. Noted for its fairs held in November, and again in February or March, for about 15 days, and attended by 15,000 people, chiefly from the *tardí*. Grain forms the principal article of commerce; from the Nepál Hills are brought iron-ore, hatchets, *tespit* or bay-leaves, and musk. The fair doubtless had its origin in pilgrims coming to visit a temple of

Mahádeo, which stood here; but the Kamli has changed its course, and washed the temple away, and now no traces of it remain.

Silang.—Mountain range and town in the Khási and Jaintia Hills District, Assam.—*See* SHILLONG.

Silchár.—Chief town, municipality, and administrative head-quarters of the District of Cachar, Assam; situated in lat. $24^{\circ} 49' 40''$ N., and long. $92^{\circ} 50' 48''$ E., on the south bank of the Barak river. Population (1881) 6567, namely, Hindus, 4807; Muhammadans, 1647; Christians, 75; and 'others,' 38. Municipal income (1881-82), £1168, or an average of 3s. 4½d. per head of the population (6869) within municipal limits. Silchar is also a military cantonment. In 1885, the 42nd Bengal Native Infantry was stationed here, together with 2 guns of mountain artillery. The town is also the head-quarters of a company of rifle volunteers. A handsome new church has been erected since the earthquake of 1869. The town is built on a neck of land formed by a bend in the river. The surface is swampy in some parts, but in others it rises into low sandy hillocks, locally called *tildr*. In recent years, much attention has been paid to sanitary improvements. A large trading fair or *melá* is held annually in January, lasting for about seven days. The average attendance is estimated at 20,000 persons; the articles sold include cotton goods and ponies from Manipur. On 10th January 1869, a severe shock of earthquake was felt at Silchár. The church and public buildings fell down, and the greater part of the *bázár* was laid in ruins. The surface was rent into deep fissures, and in some parts sank down as much as from 15 to 30 feet. Another severe shock occurred on the 13th October 1882, causing much damage to masonry buildings.

Silhetí.—*Zamindári* or petty chiefship in Drug *tahsíl*, Raipur District, Central Provinces; 60 miles north-west of Raipur town; comprising 28 villages, formerly part of Gandai chiefship. Area, 83 square miles. Population (1881) 4475, occupying 1369 houses; average density of population, 54 persons per square mile. The chief is a Gond. The village of Silhetí lies in lat. $21^{\circ} 47'$ N., and long. $81^{\circ} 9'$ E.

Sillána.—Native State in Central India.—*See* SAILANA.

Siller (*Selere*).—River in Vizagapatam District, Madras Presidency. Flows east, then north to Umada, where it turns west, and finally south-west, and joins the Saveri at Moat, about 20 miles north-east of the junction of the latter stream with the Godávari. The Siller has a very tortuous course through mountainous country; total length, about 150 miles.

Silondí.—Town in Sihora *tahsíl*, Jabalpur (Jubbulpore) District, Central Provinces. Population (1881) 2025, namely, Hindus, 1893; Kabíranthís, 42; Jains, 31; Muhammadans, 49; and non-Hindu aborigines, 10.

Silpáta.—Village in Chatgári Dwár, Darrang District, Assam, at which a large fair is held annually during the *Bor Bihu* festival, chiefly attended by the Cachari population.

Simgá.—Northern *tahsil* or Sub-division of Ráipur District, Central Provinces. Area, 1401 square miles; number of villages, 751; houses, 95,743. Total population (1881) 275,626, namely, males 136,171, and females 139,455; average density of population, 196·7 persons per square mile. Of the total area of the *tahsil*, 11 square miles are held revenue-free, leaving the assessed area at 1390 square miles. Of these, 770 square miles are returned as under cultivation, 541 square miles as cultivable but not under tillage, and 79 square miles as uncultivable waste. The adult agricultural population (male and female) was returned in 1881 at 127,251, or 46·17 per cent. of the total population of the *tahsil*. Average area of cultivated and cultivable land available for each adult agriculturist, 7 acres. Total Government land revenue, including local rates and cesses levied on land, £15,027, or an average of 7½d. per cultivated acre. Total rental, including cesses, paid by the cultivators, £29,813, or an average of 1s. 2½d. per cultivated acre. In 1884, Simgá *tahsil* contained 1 criminal and 2 civil courts, with a regular police force numbering 112 men.

Simgá.—Town in Ráipur District, Central Provinces, on the Seo river, and head-quarters of Simgá *tahsil*; 28 miles north of Ráipur town, on the road to Biláspur. Population (1881) 2277, namely, Hindus, 1633; Muhammadans, 326, Kabírpanthis, 131; Satnámis, 88; Jain, 1; and non-Hindu aborigines, 98. Besides the usual Sub-divisional courts and offices, Simgá has a town school, girls' school, police office, and post-office.

Simháchalam.—Temple in Vizagapatam District, Madras Presidency.—*See* SINHACHALAM.

Simla.—British District in the Lieutenant-Governorship of the Punjab, consisting of several detached plots of territory; situated among the hills of the lower Himálayan system. These plots are surrounded on all sides by the territories of independent chiefs under the control of the Deputy Commissioner of Simla, who is *ex officio* Superintendent of the Hill States. Area of British territory, 81 square miles. Population (1881) 42,945 souls. The administrative head-quarters are at SIMLA, the summer capital of the Government of India, in lat. 31° 6' N., and long. 77° 11' E.

Physical Aspects.—The mountains of Simla District and the surrounding Native States compose the southern outliers of the great central chain of the Western Himálayas. They descend in a gradual series from the main chain itself in Bashahr State to the general level of the Punjab plain in Ambála (Umballa) District, thus forming a transverse south-westerly spur between the great basins of the Ganges and the Indus, here

respectively represented by their tributaries the Jumna (Jamuná) and the Sutlej. A few miles north-east of Simla, the spur divides into two main ridges, one of which curves round the Sutlej valley toward the north-west, while the other, crowned by the sanitarium of Simla, trends south-eastward to a point a few miles north of Subáthu, where it merges at right angles in the mountains of the Outer or Sub-Himálayan system, which run parallel to the principal range. South and east of Simla the hills between the Sutlej and the 'Tons centre in the great peak of CHOR, 11,982 feet above the sea. Throughout all the hills, forests of *deodar* abound, while rhododendrons clothe the slopes up to the limit of perpetual snow. The scenery in the immediate neighbourhood of Simla itself presents a series of magnificent views, embracing on the south the Ambála plains, with the Subáthu and Kasauli Hills in the foreground, and the massive block of the Chor a little to the left; while just below the spectator's feet a series of huge ravines lead down into the deep valleys which score the mountain sides. Northwards, the eye wanders over a network of confused chains, rising range above range, and crowned in the distance by a crescent of snowy peaks, standing out in bold relief against the clear background of the sky. The principal torrents of the surrounding tracts are the Sutlej, Pabar, the Giri Gangá, the Gambhar, and the Sarsa.

Exclusive of military cantonments, Simla District comprises an area of less than 81 square miles, distributed over five detached *ilákas*. The first of these *ilákas* is Kálka, a small tract about one square mile in area, acquired by gift from the Mahárája of Patnála as a site for a *bázár* and depôt at the spot where the road to Simla first enters the hills. The second *iláka* is Bharauli, with which are included the isolated villages of Kala and Kalag, and a small detached group of four villages near Kasauli, known as the Shiwa *iláka*. The area of the whole is about 15,000 acres, which have remained in our possession since the close of the Gúrkha war, when the old ruling family was found to be extinct. The main Bharauli territory consists of a narrow valley in the hollow of the hills stretching from Subáthu to Kiári Ghat, on the Simla road. The third *iláka* is Simla, a small tract of less than 4000 acres, chiefly occupied by the hill station of Simla, the cultivated area being less than 200 acres. The whole *iláka* was acquired in 1830 from Patnála and Keunthál in exchange for other land. The fourth is Kotkhái, a small territory of about 22,000 acres, lying 20 miles east of Simla, around the sources of the Giri. It was acquired in 1828 by voluntary cession from the Ráná Bhagwán Singh. The fifth and last *iláka* is Kot-guru, otherwise known as Kotgarh. It is another small tract of less than 11,000 acres, lying along a spur of the Hathu mountain, on the bank of the Sutlej, 22 miles north-east from Simla as the crow flies. It originally belonged to the Kotkhái principality, was then appropriated by the

Rájá of Kúlu, from whom it was forcibly taken by Bashahr, in whose possession it remained for forty years, when it was seized by the Gúrkhas. On our invitation it was again occupied by Kúlu troops during the Gúrkha war of 1815, and was eventually retained by us when these hostilities were brought to a close.

History.—The acquisition of the patches of territory composing Simla District dates from the period of the Gúrkha war in 1815–16. At a very early time the Hill States, together with the outer portion of Kángra District, probably formed part of the Katoch kingdom of JALANDHAR (Jullundur); and, after the disruption of that principality, they continued to be governed by petty Rájás till the beginning of the present century. After the encroachments of the Gúrkhas led to the British invasion of their dominions in 1815, our troops remained in possession of the whole block of hill country between the Gogra and the Sutlej. Kumáun and the Dehrá Dún became a portion of British territory; a few separate localities were retained as military posts, and a portion of Keunthál State was sold to the Rájá of Patála. With these exceptions, however, the tract conquered in 1815 was restored to the Hill Rájás, from whom it had been wrested by the Gúrkhas. Garhwál State became attached to the Lieutenant-Governorship of the North-Western Provinces; but the remaining principalities rank among the dependencies of the Punjab, and are known collectively as the Simla Hill States. From one or other of these, the plots now composing the little District of Simla have been gradually acquired. Part of the hill over which the Simla sanatorium now spreads was retained by Government in 1816, and an additional strip of land was obtained from Keunthál in 1830. The spur known as Jutogh, $3\frac{1}{2}$ miles from the station, was acquired by exchange from Patála in 1843, as the equivalent of two villages in Barauli. Kotkhái Kotgarh, again, fell into our hands through the abdication of its Ráná, who refused to accept charge of the petty State. The Kasauli Hill originally belonged to Bija, but was relinquished in consideration of a small annual payment. Subáthu Hill was retained from the beginning as a military fort; and the other fragments of the District have been added at various dates.

Population.—The results of the Census of 1881 can hardly be regarded as fairly representing the actual state of the District, for with the exception of Barauli and Kotkhái, the British territory possesses no rural population of its own. Nor do the figures show the normal number of inhabitants on the plots which compose the District, as the Census was taken in February, one of the months when Simla and Kasauli are almost empty. Nevertheless, for the sake of uniformity, the statistics may be appended for what they are worth. The enumeration extended over an area of 81 square miles, and disclosed a total population of 42,945 persons, inhabiting 263 towns and villages, and 6559

houses. Classified according to sex, there were—males, 27,593; females, 15,352: proportion of males, 64·2 per cent. This great discrepancy between the sexes is due to the number of male immigrants connected with the sanatoria of Simla and Kasauli, who do not bring their families with them. According to religion—Hindus numbered 32,428, or 75·5 per cent.; Muhammadans, 6935, or 16·1 per cent.; Sikhs, 202, or 0·5 per cent.; Jains, 23; Buddhists, 4; and Christians, 3353, or 7·8 per cent. The Bráhmans numbered 2567. Among these the Sísani grade ranks highest in popular estimation, and supplies the Rájás and Ránás of the Hill States with priests. Others of the Bráhmans engage in agriculture. The Rájputs numbered 1849, of whom 359 were Muhammadans; they resemble their hill brethren in Kángra. The Kanets (9090 in number) form the characteristic tribe of Simla, and are popularly supposed to be Rájputs who have lost caste by buying wives and permitting the remarriage of widows. Kolís numbered 3795, and Chamárs 3384. The Muhammadans, classified by race as apart from religion, included—Shaikhs, 3676; Patháns, 1420; Sayyids, 315; and Kashmírís, 215. The Christian population included—Europeans, 2898; Eurasians, 245, and natives, 210. All classes of the hill population are simple-minded, orderly people, truthful in character and submissive to authority, so that they scarcely require to be ruled.

The chief towns (or stations) are SIMLA (13,258 in February 1881), KASAUJI (2807), DAGSHAI (3642), SUBATHU (2329), SOLAN, and KALKA. Of the 263 villages scattered over the Simla territory, 242 contain less than two hundred inhabitants, and 15 between two hundred and one thousand; while only 6 contain upwards of one thousand inhabitants.

Agriculture, etc.—The time of sowing and harvesting in the hill country depends very greatly upon the elevation. Cultivation is carried on among all the lower valleys, but even more rudely than in the similar glens of Kángra District. The fields are artificial terraces, built up against the mountain-sides, and sown with maize, pulses, or millet for the autumn, and with wheat for the spring harvest. Poppy, hemp, turmeric, ginger, and potatoes form the principal staples raised for exportation to the plains. The last-named crop, introduced under British rule, has rapidly grown in favour, and now occupies many fresh clearings on the hill-sides in the neighbourhood of Simla. Land is measured, not by superficial extent, but by the quantity of seed which is required to sow it. Most of the cultivators till their own little plots, and rent is practically unknown. Throughout the hills, the employment of hired labour for agricultural purposes is almost unknown, the people combining together to aid one another in special undertakings, and expecting to receive similar help in return whenever they may require it. Wages for artisans and day-labourers in

1883-84 ranged from 9d. to 1s. 6d. for skilled hands, and from 6d. to 9d. for coolies. Prices of food-grains ruled as follows on the 1st of January 1884:—Wheat, 15 *seers* per rupee, or 7s. 6d. per cwt.; barley, 19 *seers* per rupee, or 5s. 11d. per cwt.; Indian corn, 14½ *seers* per rupee, or 7s. 9d. per cwt.; best rice, 4½ *seers* per rupee, or 25s. 5d. per cwt.

Commerce, Communications, etc.—The trade of the District centres mainly in the *bázárs* of SIMLA, which forms a considerable entrepôt for the produce of the hill tracts. RÁMPUR, on the Sutlej, has also some importance as a depôt for the shawl-wool (*pashm*) brought in by the mountaineers of Spiti and of Chinese Tartary. Part of it is worked up on the spot into coarse shawls, of the kind now made also at Ludhiána and Amritsar (Umrtsur), and known as Rámpur *chadars*; but the greater part is bought up by merchants for exportation to British India. The hill paths are so steep that most of the wool is brought down on the backs of the sheep, which are then sheared, and laden with grain for the return journey. The Rámpur fair, on the 10th and 11th of November, attracts a large number of hillmen and of traders from the plains. The main roads of the Simla Hills are those which lead from Kálka to Simla, and from Simla towards Rámpur and Cháni on the Tibetan border. Only small portions of these, however, lie actually within British territory. The old road from Kálka to Simla, *viâ* Kasauli and Subáthu, is practicable for horses, mules, ponies, or cattle, but not for wheeled conveyances. The distance by this route is 41 miles, and the journey can be performed by relays of ponies in eight hours. The new cart-road takes a more circuitous route, *viâ* Dagshai and Solan. The distance amounts to 58 miles, and two-wheeled carts traverse the whole distance in about nine or ten hours. All the heavy traffic between Simla and the plains passes by this route. Staging bungalows have been built on all the roads at frequent intervals. A line of telegraph follows the old road, with stations at Kálka, Kasauli, and Simla.

Administration.—The Simla Hill States are under the superintendence of the Deputy Commissioner of Simla, subordinate to the Commissioner at Ambála (Umballa). The total imperial revenue of the British District amounted in 1883-84 to £15,259, of which sum the land-tax contributed £1360. The other items of importance were stamps and excise. The number of civil and revenue judges in the same year was 8, and the number of magistrates 7. The regular and municipal police force numbered 280 officers and men, being at the rate of 1 man to every 153 of the population. The Simla jail contained in 1883-84 a total of 172 prisoners, with a daily average of 20. Including the Lawrence Military Asylum for soldiers' children, there were 1263 children receiving education in 1883-84, in 29 Government aided or inspected schools; besides 10 indigenous village schools, with about 120 pupils. The educational establishments include Bishop

Cotton's School, a District School, Roman Catholic Female Orphanage, Punjab Girls' School, Mayo Industrial Girls' School, and American Presbyterian Mission at Subáthu. The Lawrence Military Asylum, established in 1852, stands upon the crest of a hill facing Kasauli, from which it is distant by road 3 miles. The only municipality is that of SIMLA.

Medical Aspects.—The climate of the Simla Hills is admirably adapted to the European constitution, and the District has therefore been selected as the site of numerous sanatoria and cantonments. The average mean temperature at Simla for each month of the year over a period of ten years ending in 1881 is as follows.—January, 40·2° F.; February, 41·8°; March, 49·2°; April, 58·7°; May, 63·5°; June, 67·6°; July, 64·3°; August, 63·1°; September, 61·3°; October, 55·6°; November, 48·7°; December, 44·7° F. Mean annual average, 54·9°. The average annual rainfall amounts to 70·42 inches, according to a calculation made in 1881 upon observations extending over twenty years, distributed as follows.—January to May, 15·96 inches; June to September, 52·27 inches; October to December, 2·19 inches.

Cholera visited Simla, Kasauli, Subáthu, and Dagshai in 1857, 1867, 1872, and 1875, though one or other station escaped in each visitation. In 1857, the death-rate among Europeans from cholera was 3·5 per thousand, and in 1867, 4·2 per thousand. The registered death-rate of Simla in 1883 was 18 per thousand. Gout, leprosy, and stone are reported to be prevailing endemic diseases, and syphilis is said to be very common amongst the hill people. The only disease usually contracted by Europeans is that known as hill diarrhœa, a very troublesome form of the ailment. Government maintains three charitable dispensaries—at Simla, Kasauli, and Dagshai. In 1883 they gave relief to a total number of 16,185 persons, of whom 655 were in-patients. In 1885, a large first-class hospital, with special wards for European patients, was opened in Simla [For further information regarding Simla, see the *Report on the Land Revenue Settlement of Simla District*, by Colonel E. G. Wace (Calcutta, 1884); also the *Punjab Census Report* for 1881; and the several annual Administration and Departmental Reports of the Punjab Government.]

Simla.—*Tahsil* of Simla District, Punjab; consisting of the two detached *fargands* of Simla and Barauli. Area, 4 square miles. Population (1881) 33,098, namely, males 22,739, and females 10,359. Hindus number 22,753; Muhammadans, 6804; Sikhs, 200; and 'others,' nearly all Christians, 3341. Revenue of the *tahsil*, £662. The administrative staff, including the head-quarters officers, comprises a Deputy Commissioner, 2 Assistant or Extra-Assistant Commissioners, Judge of Small Cause Court, *tahsildár*, and one honorary magistrate. These officers preside over 5 civil and 6 criminal courts; number of police circles (*thánás*), 6; regular and municipal police, 124 men.

Simla.—Town, municipality, and administrative head-quarters of Simla District, Punjab; chief sanitarium and summer capital of British India. Situated on a transverse spur of the Central Hīmalayan system, in lat. $31^{\circ} 6' N.$, and long. $77^{\circ} 11' E.$ Mean elevation above sea-level, 7084 feet. Distant from Ambāla (Umballa) 78 miles; from Kālka, at the foot of the hills, by cart-road, 58 miles. Population in January 1868, 7656; in July 1869, at the beginning of the season, 14,848, of whom 1434 were Europeans and 13,414 natives. In February 1881, at the time when the population of the station was at its lowest, the Census returned the population at 13,258, namely, males 9881, and females 3377. Hindus numbered 8377; Muhammadans, 3153; Sikhs, 164; Jains, 14; and 'others,' nearly all Christians, 1550. In August and September, when the season is at its height, the population considerably exceeds this number. The municipal income, which in 1875-76 was only £5281, had by 1884-85 increased to £20,391.

A tract of land, including part of the hill now crowned by the station, was retained by the British Government at the close of the Gūrkhā war in 1815-16. Lieutenant Ross, Assistant Political Agent for the Hill States, erected the first residence, a thatched wooden cottage, in 1819. Three years afterwards, his successor, Lieutenant Kennedy, built a permanent house. Officers from Ambāla and neighbouring stations quickly followed the example, and in 1826 the new settlement had acquired a name. A year later, Lord Amherst, the Governor-General, after completing his progress through the North-West, on the conclusion of the successful Bhartpur campaign, spent the summer at Simla. From that date, the sanitarium rose rapidly into favour with the European population of Northern India. Year after year, irregularly at first, but as a matter of course after a few seasons, the seat of Government was transferred for a few weeks in every summer from the heat of Calcutta to the cool climate of the Hīmalayas. Successive Governors-General resorted with increasing regularity to Simla during the hot weather. Situated in the recently annexed Punjab, it formed an advantageous spot for receiving the great chiefs of Northern and Western India, numbers of whom annually come to Simla to pay their respects to the British Suzerain. It also presented greater conveniences as a starting-point for the Governor-General's cold-weather tour than Calcutta, which is situated in the extreme south-east corner of Bengal. At first only a small staff of officials accompanied the Governor-General to Simla; but since the administration of Sir John Lawrence (1864), Simla has practically been the summer capital of the Government of India, with its secretariats and head-quarters establishments, unless during exceptional seasons of famine on the plains, as in 1874.

Under these circumstances, the station grew with extraordinary rapidity. From 30 houses in 1830, it increased to upwards of 100 in

1841, and 290 in 1866. In February 1881, the number of occupied houses was 1141. At present, the bungalows extend over the whole length of a considerable ridge, which runs east and west in a crescent shape, with its concave side pointing southward. The extreme ends of the station lie at a distance of 6 miles from one another. Eastward, the ridge culminates in the peak of Jako, over 8000 feet in height, and nearly 1000 feet above the average elevation of the station. Woods of *deodar*, oak, and rhododendron clothe its sides, while a tolerably level road, 5 miles long, runs round its base. Another grassy height, known as Prospect Hill, of inferior elevation to Jako, and devoid of timber, closes the western extremity of the crescent. The houses cluster thickest upon the southern slopes of Jako, and of two other hills lying near the western end. The Viceregal Lodge, formerly named Peterhoff, stands upon one of the latter; while the other is crowned by a large building erected for an observatory, but now used as an ordinary residence. A new and more commodious Viceregal residence is now (1886) in course of erection on the Observatory hill, a little to the west of the present Government House. The church stands at the western base of Jako, below which, on the south side of the hill, the native *bazār* cuts off one end of the station from the other. The eastern portion bears the name of Chota Simla, while the most western extremity is known as Boileauganj. A beautiful northern spur, running at right angles to the main ridge, and still clothed with oak and old rhododendron trees, has acquired the complimentary designation of Elysium. Three and a half miles from the western end, a battery of artillery occupies the detached hill of Jutogh. The exquisite scenery of the neighbourhood has been described in the article on SIMLA DISTRICT.

The public institutions include the Bishop Cotton School, the Punjab Girls' School, the Mayo Industrial Girls' School, a Roman Catholic convent, a hospital, a dispensary, and a handsome Town Hall now (1886) approaching completion. The Government buildings comprise a District court-house and treasury, *tahsili* and police office, post-office, telegraph station, etc. Until recently, the various public offices were located in ordinary private houses, in many cases widely distant from each other. Since 1884, the offices of the Imperial Government have been concentrated in blocks of handsome buildings, centrally situated, and constructed at a cost of upwards of half a million sterling.

The commerce of the town consists mainly in the supply of necessities to the summer visitors and their dependants; but a brisk export trade exists in opium, *charas* (an intoxicating preparation of hemp), fruits, nuts, and shawl-wool, collected from the neighbouring hills, or brought in from beyond the border *viâ* Rāmpur. Numerous European shops supply the minor wants of visitors, most of them being branches

of Calcutta firms. The station has three English banks, a club, and several churches; and two European breweries are situated in the valley below. The great deficiency of Simla lies in its inadequate water-supply. A water-supply by means of pipes supplies Simla with water from the Mahásu range; but the constantly increasing population puts a strain upon the works which they are at times scarcely able to bear, and a further extension of the works, by the construction of additional reservoirs, is now well advanced towards completion. The springs are few in number, and several of them run dry during the summer months, when the demand for water is greatest.

Simla Hill States.—A collection of twenty-three Native States surrounding the sanitarium of Simla; bounded on the east by the high wall of the Himálayas; on the north-west by the mountains of Spiti and Kúlu belonging to the District of Kángra, and lower down by the Sutlej, separating them from the State of Sukét and Kángra proper; on the south-west by the plains of Ambála, on the north-east by the Dehrá Dún and the Native State of Garhwál. They extend between the parallels of lat. $30^{\circ} 20'$ and $32^{\circ} 5'$ N, and long. $76^{\circ} 30'$ and $79^{\circ} 1'$ E. They are controlled by the Superintendent of Hill States in subordination to the Commissioner of Ambála. The table on the opposite page gives a few of the leading statistics regarding them.

The mountains of the Simla States form a continuous series of ranges ascending from the low hills which bound the plains of Ambála to the great central chain of the Eastern Himálayas. This central chain terminates a few miles south of the Sutlej in the most northern of the States, that of Bashahr (Bassáhir). The same State is broken on its northern frontier by spurs from the snowy hills which separate it from Spiti, and on the east by similar spurs from the range by which it is shut off from Chinese Tartary. Starting from the termination of the Central Himálayas, a transverse range—the last to the south of the Sutlej—runs south-west throughout the length of the Simla States, forming the watershed between the Sutlej and the Jumna—in other words, between the Indus and the Ganges. A few miles north-east of Simla, it divides into two main branches, one following the line of the Sutlej in a north-west direction, and the other continuing south-east, until, at a few miles north of Subáthu, it meets at right angles the mountains of the Outer or Sub-Himálayan system, which have a direction parallel to the Central Himálayas, *i.e.* from north-east to north-west. It is upon this branch that the sanitarium of Simla lies.

South and east of Simla, the hills lying between the Sutlej and the Tons, the principal feeder of the Jumna, centre in the great Chor mountain, 11,982 feet high, itself the termination of a minor chain that branches off southwards from the main Simla range.

[Continued on page 500.]

AREA, POPULATION, ETC., OF THE SIMLA HILL STATES.
(According to the Census of 1881.)

SIMLA HILL STATES.

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NAME OF STATE.	Area in Square Miles.	Towns and Villages.	Houses.	POPULATION			Density of Population per Square Mile.	Estimated Revenue	Tribute
				Total Population	Males.	Females.			
Simmur (Nahan), . . .	1,077	2,069	21,562	112,371	63,305	49,066	104	21,000	L
Bilaspur (Kahlur), . .	448	1,073	9,625	86,546	47,133	39,413	193	10,000	800
Bashahr (Rasshaur), . .	3,320	836	8,533	64,345	33,019	31,326	19	5,000	391
Flindur (Nalgargh), . .	252	331	10,246	53,373	29,082	24,291	212	9,000	500
Buket, . . .	474	220	8,658	52,484	29,280	23,204	109	10,000	1,100
Keonthul, . . .	116	838	6,318	31,154	17,329	13,825	264	6,000	360
Bughal, . . .	124	346	1,445	20,633	11,036	9,597	166	6,000	352
Jabal, . . .	288	472	3,051	19,196	10,605	8,591	67	3,000	252
Jhajji, . . .	66	327	582	12,106	6,720	5,386	126	2,300	144
Kumharren, . . .	90	254	1,445	9,515	4,920	4,595	106	1,000	141
Mailog, . . .	48	222	626	9,169	4,966	4,203	191	1,000	141
Malan, . . .	51	152	1,263	5,190	2,878	2,312	102	700	108
Bughat, . . .	36	178	1,954	8,339	4,957	3,382	222	800	60
Kuthar, . . .	7	150	863	3,648	2,020	1,628	521	500	100
Dharmi, . . .	26	214	688	3,322	1,776	1,546	128	800	72
Taroch, . . .	67	41	538	3,216	1,850	1,366	48	600	29
Sangri, . . .	16	105	435	2,593	1,440	1,153	162	100	18
Kunhar, . . .	8	66	440	1,923	1,017	906	241	400	18
Ilja, . . .	4	33	263	1,158	649	509	289	100	18
Mangal, . . .	12	33	209	1,060	583	477	83	70	7
Kawal, . . .	3	18	133	752	426	326	251	60	..
Darkul, . . .	5	8	92	590	295	295	118
Didhi, . . .	1	10	44	170	98	72	170
Total, . . .	6,569	7,999	179,014	502,853	275,384	227,469	77	78,430	4,306

Continued from page 498.]

The mountain system of these States (excluding Bashahr (Bassáhir) may be thus mapped out roughly into three portions:—(1) The Chor mountain, and spurs radiating from it, occupying the south-east corner; (2) the Simla range, extending from the central Himálayas to the neighbourhood of Sabáthu; (3) the mountains of the Sub-Himálayan series, running from north-east to north-west, and forming the boundary of the Ambála plains.

The last-mentioned group may be sub-divided into the Sub-Himálayas proper, and an outer range, corresponding to the Siwálik hills of Hoshiárpur on the one side, and of the Gangetic Doáb on the other. The Sub-Himálayan and the Siwálik ranges form parallel lines, having between them an open space of varying width. In Náhan this open space is known as the Khárda Dún, a broad and well-cultivated valley. The corresponding Dún in Nálágarh is still more open, and is also richly cultivated.

The wilder parts of Bashahr (Bassáhir) beyond the Sutlej are thus described by Sir H. Davies:—

‘Immediately to the south of Spiti and Láhul is the district of Kunáwár, which forms the largest sub-division of the Bashahr principality, and consists of a series of rocky and precipitous ravines, descending rapidly to the bed of the Sutlej. The district is about 70 miles long by 40 and 20 broad at its northern and southern extremities respectively. In middle Kunáwár the cultivated spots have an average elevation of 7000 feet. The climate is genial, being beyond the influence of the periodical rains of India; and the winters are comparatively mild. Upper Kunáwár more resembles the Alpine region of Tibet. Grain and fuel are produced abundantly; the poppy also flourishes. The Kunáwáris are probably of Indian race, though in manners and religion they partially assimilate to the Tibetans. The people of the north are active traders, proceeding to Leh for *charas*, and to Gardokh for shawl-wool, giving in exchange money, clothes, and spices. The mountain paths are scarcely practicable for laden mules, and merchandise is carried chiefly on the backs of sheep and goats.’

The principal rivers by which the drainage of these hills is effected are the Sutlej, the Pabar, the Giri or Giri Gangá, the Gambhar, and the Sarsa.

The Sutlej enters Bashahr State from Chinese territory by a pass between two peaks, the northern of which is 22,183 feet above sea-level, and flows south-east through Bashahr, receiving the drainage from the Central Himálayas on the one side and the Spiti hills on the other, till it reaches the border of Kúlu, a few miles above the town of Rámpur. From this point it forms the western boundary of the Simla States, until, shortly before reaching the border of Kángra proper, it turns southwards,

and passes through the State of Biláspur, which it divides into two nearly equal portions. It is crossed by bridges at Wangtu, and at Lauri below Kotgarh. In Biláspur small boats are employed on the river: elsewhere inflated skins are used to effect a passage. The river is not fordable at any point. Its principal feeders in Bashahr are the Baspa from the south, and the Spiti from the north.

The Pabar, which is one of the principal feeders of the Tons, and therefore of the Jumna, rises in the State of Bashahr, having feeders on the southern slopes both of the Central Himálayas and the transverse Simla range. It flows southwards, and, passing into Garhwál, there joins the Tons.

The Giri, or Giri Gangá, rises in the hills north of the Chor, and collecting the drainage of the whole tract between that mountain and the Simla range, flows south-west until, meeting the line of the Outer Himálayas, it turns sharply to the south-east, and, passing through the whole length of the State of Náhan, empties itself into the Jumna about 10 miles below the junction of that river with the Tons. Its principal feeder is the Ashmi, or Assan river, which rises near Mahásu, in the Simla range, and, after receiving a considerable contribution from the eastern face of the hill upon which Simla station stands, joins the Giri just at the point where that river turns south-east.

The Gambhar rises in the Dagshai hill, and running north-east past Subáthu, receives the Blini and several other streams, which rise in the hills to the south of Simla station, and, still continuing its course north-east, empties itself into the Sutlej about 8 miles below the town of Biláspur.

The Sarsa collects the drainage of the Dún of Náligarh.

Of these streams, the Pabar and Giri Gangá are of considerable volume. Of the rest, except the Sarsa, all are perennial, retaining a small supply of water even in the winter months, and swelling to formidable torrents during the rainy season. The Pabar alone is fed from perennial snow.

Further information regarding the Simla Hill States will be found in the separate articles on each, in their alphabetical order.

Simráon.—Ruined town in Champáran District, Bengal; situated partly in Nepál territory, the frontier line passing through the walls. The remains of the fort are in the form of a square, surrounded by an outer wall 14 miles in circumference, and by an inner one of only 10. Inside are scattered the ruins of large buildings. The Isrá tank measures 333 yards along one side, and 210 along the other. The portions of the palaces and temples left standing disclose some finely carved basements, with a superstructure of bricks. Twenty idols have been extricated, many, however, being much mutilated. The citadel is situated to the north, and the palace in the centre of the town; but

both only exist as mounds, covered with trees and jungle. Tradition says that Simráon was founded by Nánapá Deva in 1097 A.D. Six of his dynasty reigned with much splendour; but the last of the line, Hári Singh Deo, was driven out in 1322 by the Muhammadans.

Simrauta.—*Parganá* in Dighijaiganj *tahsíl*, Rái Bareli District, Oudh; bounded on the north by Haidargarh, on the east by Inhauna, on the south by Rái Bareli, and on the west by Kumhráwán and Haidoi. Area, 97·4 square miles, or 62,337 acres, of which 40·1 square miles, or 26,698 acres, are under cultivation. Population (1881) 52,480, namely, males 25,529, and females 26,951. Government land revenue, £6171, or at the rate of 3s. 11½d. per arable acre. Of the 73 villages comprising the *parganá*, 50 are held under *tálukdári*, 22 under *zamindári*, and 1 under *pattidári* tenure. Kanhpuria Rájputs are the principal landed proprietors, owning 35 of the *tálukdári* villages.

Sinawan.—*Tahsíl* in Muzaffargarh District, Punjab.—See SANAWAN.

Sinchal Pahár.—Long undulating mountain spur in Dárjiling District, Bengal, stretching gradually down to the Tista (Teesta), from the top of which, in lat. 26° 59' N., and long. 88° 20' 5" E., at a height of 8607 feet above the sea-level, Mount Everest is just visible. This hill is the loftiest mountain in the vicinity of Dárjiling station; its two peaks are locally known as the Bará and Chhotá Durbín. Their summits are covered with grass, and their sides are clothed with forest trees, bamboos, ferns, and scrub jungle. There were formerly barracks for a European regiment on the hill, but they have been abandoned for some years in favour of the lower site at Jallapahár.

Sinchulá.—Hill range in Jalpáiguri District, Bengal; forming the boundary between British territory and Bhután. Its average elevation is from 4000 to a little over 6000 feet, the highest peak, Reníngango (lat. 26° 47' 30" N., long. 89° 37' 15" E.), being 6222 feet above sea-level. The hills run generally in long even ridges, thickly wooded from base to summit; but at places the summits bristle up into bare crags from 200 to 300 feet. From Chhotá Sinchulá (5695 feet high) a magnificent view is obtained over the whole of the Baxá Dwár. In the distance are seen large green patches of cultivation in the midst of wide tracts of brown grass and reed jungle, the cultivated spots being dotted with homesteads; in the foreground, near the hills, are dense *sál* and other tree forests, the whole being intersected by numerous rivers and streams. The Sinchulá range can nearly everywhere be ascended by men and by beasts of burden, but not by wheeled vehicles of any description.

Sind (Scinde).—A Province of British India, forming a Commissionership under the Governor of Bombay; lying between 23° and 28° 40' N. lat., and between 66° 50' and 71° E. long. The Province of

Sind forms the extreme north-western portion of the Bombay Presidency, consisting of the lower valley and the delta of the Indus. It is bounded on the north by Balúchistán, the Punjab, and Baháwalpur State; on the east by the Native States of Jaisalmer and Jodhpur in Rájputána; on the south by the Rann of Cutch (Kachchh) and the Arabian Sea; and on the west by the territories of the Khán of Khelát. The Province of Sind consists of two classes of territory—(1) the five British Districts within the Province, and (2) the Native State of Khairpur. The aggregate area of the five British Districts was returned in 1881 at 48,014 square miles, or 38·55 per cent. of the area of the British territory of the Bombay Presidency, the total population at 2,413,823, or only 14·67 per cent. of the population of the Bombay Presidency. The Native State of Khairpur has an area of 6109 square miles, and a population (1881) of 129,153. Including Khairpur State, the Province of Sind contains an area of 54,123 square miles, and population (1881) of 2,542,976 souls. The administrative headquarters are at the city of KARACHI (Kurrachee), but the ancient capital of HAIDARABAD still ranks among the populous towns of the Province. The following table exhibits the area, population, etc., of Sind according to the Census of 1881:—

AREA, POPULATION, ETC., OF SIND.

UNDER BRITISH ADMINISTRATION.							
DISTRICTS.	Area in Square Miles	Number of Towns and Villages	Number of Houses	POPULATION.			Density of Population per Square Mile
				Total Population	Males.	Females.	
Karachi,	14,115	723	87,059	478,688	265,988	212,700	33·9
Haidarabad, . . .	9,030	1105	150,488	754,624	407,243	347,381	83·3
Shikarpur, . . .	10,001	1373	137,702	852,986	461,033	391,953	85·2
Thar and Parkar,	12,729	73	36,412	203,344	112,400	90,944	15·9
Upper Sind Frontier,	2,139	143	21,923	124,181	70,166	54,015	58·0
Total, . . .	48,014	3417	433,584	2,413,823	1,316,830	1,096,993	50·3
NATIVE STATE.							
Khairpur, . . .	6,109	.	25,720	129,153	70,716	58,407	21·1
GRAND TOTAL, .	54,123		459,304	2,542,976	1,387,546	1,155,400	47·0

The following account of Sind, and the articles on places within that Province, are mainly condensed from Mr. A. W. Hughes' excellent and elaborate *Gazetteer of the Province of Sind* (London, 1876, second edition).

Physical Aspects.—Almost every portion of the great alluvial tract of Sind has at some time or other formed a channel for the river Indus itself, or one of its many branches. The main central stream of North-Western India, after collecting into its bed the waters of the five Punjab rivers, has deposited near its debouchure into the Arabian Sea a vast mass of deltaic matter, through which it flows by several shifting channels to join the sea on the southern border of the Province. In every direction, traces of ancient river beds may be discovered crossing the country like elevated dikes; for the level of the land, as in all other deltaic regions, is highest at the river bank. The Indus brings down from the turbid hill torrents a greater quantity of detritus than can be carried forward by its diminished velocity in the plain, and hence a constant accumulation of silt takes place along its various beds, raising their level above that of the surrounding country, and incidentally affording an easy opportunity of irrigation by side channels drawn from the central river.

The only elevations deserving the name of mountains occur in the Kirthar range, which separate Sind from Balúchistán, and attain in places a height of more than 7000 feet above sea-level. They first touch the Sind frontier about the 28th parallel of north latitude, and form the British boundary for 120 miles. Thenceforward they sink considerably in altitude, forming the lesser chain of the Pab hills, which after a length of 90 miles in a southerly direction terminate on the sea-coast in the promontory of Cape Monze. Their average elevation does not rise above 2000 feet. Among the valleys and ravines of the Pab range flows the river Hab, the only permanent stream in Sind, except the Indus and its tributaries. The wild and rocky tract of KOMISTAN, in the western portion of Karachi District, forms almost the only remaining exception to the general flatness of the Province. Another offshoot of the Kirthar chain, however, known as the Lakki range, extends in a barren mass eastward into the Sehwan Sub-division, and presents evident marks of volcanic origin in its frequent hot springs and sulphurous exhalations. A few insignificant limestone ranges intersect the Indus valley, on one of which, known as the Ganjo hills, with an elevation of only 100 feet, stands the Talpur capital of HAIDARABAD. A second small chain, running in a north-westerly direction from the neighbourhood of Jaisalmer, attains towards the Indus a height of 150 feet, and forms the rocks on which are perched the towns of ROHRI and Sukkur, as well as the island fortress of BUKKUR (Bakhar).

The plain country comprises a mixed tract of dry desert and alluvial plain. The finest and most productive region lies in the neighbourhood of Shikárpur and Lárkhána, where a long narrow island extends for 100 miles from north to south, enclosed on one side by the river Indus, and on the other by the Western Nára. Another great alluvial tract, with an average width of 70 or 80 miles, stretches eastward from the Indus to the Eastern Nára. The Indus appears at one time to have spread its fertilizing waters through the wide waste at present known as the Eastern Desert, in the District of Thar and Párkar. Vestiges of ancient towns still stud the treeless expanse, and dry watercourses intersect it in every part. Sandhills abound near the eastern border, shifting under the influence of each prevailing wind. Large tracts rendered sterile for want of irrigation also occur in many other parts of Sind. Among them the most noticeable is the Pat, or desert of Shikárpur, commencing 30 miles west of that town, and stretching to the foot of the Bolán Pass, and formed from the clay deposited by the Bolán, the Nári, and other mountain torrents of the Kirthar range.

The scenery of Sind naturally lacks variety or grandeur, and its monotony renders it tame and uninteresting. Nothing can be more dreary to a stranger approaching the shore than the low and flat coast, entirely devoid of trees and shrubs. Even among the hills of Kohistán, where fine rocky scenery abounds, the charm of foliage is almost totally wanting, owing to the volcanic nature of the rock. In the Thar and Párkar District, in the eastern portions of Khairpur State, and in the Sub-division of Rohri, the *regsthán* or desert tract consists of nothing but sandhills, many of which, however, derive picturesqueness from their bold outline, and are sometimes even fairly wooded. The various ranges of sandhills succeed one another like vast waves.

Lakes are rare, the largest being the MANCHHAR in the Sehván Sub-division, formed by an expansion of the Western Nára. During the inundation season it measures 20 miles in length, and covers an area of about 180 square miles. At the same period, the flood-hollows (*dandhs*) of the Eastern Nára form pretty lakelets, but in spite of their great beauty they are seldom visited, as the miasma renders them dangerous places in which to encamp.

The alluvial strip which borders either bank of the Indus for a distance of 12 miles, though superior to every other part of Sind in soil and productiveness, can lay no claim to picturesque beauty. Even here, however, extensive forests of *Acacia arabica* (*babúl*) in many places skirt the reaches of the river for miles together. Near the town of SEHWAN, the Lakhi range forms an abrupt escarpment toward the river in a perpendicular face of rock 600 feet high. But the finest views in the Province are those which embrace the towns of Sukkur and Rohri, and the island fortress of Bukkur, with its lofty

castellated walls, lying in the river between them. All three crown the range of limestone hills through which the Indus has here cut its way, and the minarets and houses, especially in Rohri, overhang the stream from a towering height above. A little to the south of Bukkur, again, lies the green island of Sádih Bela with its sacred shrine, while groves of date-palm and acacia stud the banks of the Indus on either side.

The soil of Sind consists of a plastic clay, strongly impregnated with salt. When covered with the floods (*lits*) of the Indus, either by artificial irrigation or through spontaneous change of channel, it quickly assumes the appearance of a rich lowland, and it changes its aspect as quickly to that of an arid desert when the water is once more diverted elsewhere. The land is thus fertile enough in the immediate neighbourhood of the existing river branches to yield two or more crops in the year without manuring. Nevertheless, the soil contains a large admixture of saltpetre; and in Southern Sind, where sand greatly prevails, it is so impregnated with common salt as to produce it in abundance by evaporation, after simply pouring water through its surface.

The extent of forest land is small for a Province of so large an area, only about 625 square miles being covered with woodland, not including those in Khairpur State. The Forest Department has charge of about 90 separate forests, chiefly situated along the banks of the Indus, extending southward from Ghotki to the middle delta. They run in narrow strips, from a quarter of a mile to 2 miles in breadth, and about 3 miles in length. These strips of forest are currently reported to have been constructed as game preserves by the Mírs. Many of them suffer greatly at times from the encroachments of the stream. The floods of 1863 swept away 1000 acres of the Dhárejā forest in Shikárpur District, and a similar misfortune occurred to the forests of Sundarbela and Sámtia in the two succeeding years.

The indigenous trees consist chiefly of *babúl* (*Acacia arabica*), *bahan* (*Populus euphratica*), *kandi* (*Prosopis spicigera*), and *lai* (*Tamarindus indica*). The *babúl*, the staple tree of Lower Sind, produces good timber for boat-building and fuel; while its seed-pods supply a food for fattening cattle, its bark is employed for tanning, and its leaves form a favourite fodder of camels and goats. The *bahan*, the commonest tree of Upper Sind, yields a light soft wood for building purposes, from which also are manufactured the celebrated lacquered boxes of Hála and Khánót. The *lálí* (*Dalbergia Sissoo*) grows to some extent in Upper Sind, though it cannot be considered as indigenous to the Province. The delta of the Indus contains no forests, but its shores and inlets abound with low thickets of mangrove trees, whose timber makes a good fuel. The Forest Department has lately intro-

duced several valuable exports, including the tamarisk, the water-chestnut and the tallow tree. The revenue from this source has largely increased during the last two decades. In 1883-84, the amount realised by the sale of timber of all descriptions, including firewood, was £28,092. The date palm (*Phoenix sylvestris*) ripens its fruit in Sind, while the country also produces excellent apples, being to some extent intermediate in its flora between Hindustan and Khorasan. One third of the indigenous vegetation is Arabian or Egyptian.

The native fauna includes the tiger, found occasionally in the jungles of Upper Sind, the hyæna, the *garhiar* or wild ass, the wolf, fox, wild hog, antelope, hog-deer, and ibex in the western hills, as well as the vulture and several falcons. The flamingo, pelican, stork, crane, and Egyptian ibis frequent the shores of the delta. Bustard, rock grouse, quail, and partridge occur among the game birds, while flocks of wild geese, *kulargi*, ducks, teal, and curlew cover the lakes and *lands* during the cold season. Venomous snakes abound, and yearly cause a large number of deaths. The river fisheries of the Indus and its offshoots not only supply the Province with fresh fish, but afford a considerable export trade in dried *fisha*, the *hilsa* of Bengal. Among domestic animals, the camel of the one-humped variety ranks first as a beast of burden, immense numbers being bred in the salt marshes of the Indus. Great herds of buffaloes graze on the swampy tracts of the delta; and *gah*, made from their milk, forms an important item of export trade. Sheep and goats abound in Upper Sind, on the borders of the Pat in Shikarpur District, and in Thar and Parkar. The horses, though small, are active, hardy, and capable of enduring great fatigue. The Baluchis of Upper Sind pay much attention to the breeding of mares. The Government have introduced English stallions; and horse-breeding is carried on for the purpose of furnishing a superior class of remounts for the cavalry, as well as improving the breed of horses in the country. The bullocks are small in size, and chiefly used for draught or for turning irrigation wheels.

The extreme south-eastern border of Sind is formed by the RANN OF CUTCH (KACHCHH), an immense salt-water waste, with an area of about 9000 square miles. It bounds the District of Thar and Parkar for a distance of nearly 40 miles. Every part of it is devoid of herbage, and a large portion is annually converted into a salt lake from June to November, owing to the influx of the sea at Lakhpat Bandar on the Kori mouth of the Indus, as well as at other places in Cutch (Kachchh) and Káthiáwár. During the remaining six months of the year, after the evaporation of the water, the surface becomes incrustated with salt, while herds of antelopes and wild asses roam over the desert expanse. According to local tradition, a well-tilled plain, irrigated by a branch of the Indus, once covered this portion of the Rann; but either the hand

of man or an earthquake diverted the waters, and the tract has ever since remained a waste of salt. The upper part of the Kori mouth still bears the name of the Purāna or ancient stream; and there is little doubt that the Indus once took a more easterly course than at present, and so rendered some portion of the Rann a fertile lowland.

The whole sea-coast of Sind, except the part between Karáchí (Kurrachee) and Cape Monze where the Pab hills approach the shore, is low and flat, and submerged at spring-tides. It consists, in fact, of a series of mud-banks deposited by the Indus, or in a few places of sandhills blown from seaward. *The sea near the shore is very shallow, owing to the quantity of mud brought down by the river.* A bank extends along the coast from Karáchí to Cutch, about 2 miles from the land, and 3 miles in width, generally dry at low water. This circumstance renders the approach to the shore extremely dangerous for large vessels.

History.—Sind owes its name as well as its existence to the river Indus or Sindhu, a Sanskrit term signifying water; though Muhammadan scholars prefer to derive the word from an eponymic patriarch Sind, the brother of Hind, and son of Nuh or Noah, whose descendants ruled over the country for many generations. Previous to the Arab invasion in 711 A.D., a Hindu dynasty appears to have reigned at Aror, near the present town of Rohri; and their capital, on the bank of the Indus, possessed many fine buildings, with extensive pleasure-gardens. The dominions of the native dynasty stretched, according to local tradition, from Kashmír and Kanauj to Surat and to Omán, besides including the Afghán territories of Kandahár and the Suláimán hills. The names of five kings belonging to this earliest line have been preserved to us, and their reigns are said to have extended over an aggregate of 137 years.

A Bráhman chamberlain to the last of them, by name Chachh, established himself on the throne after his master's death, and left the kingdom to two of his family in succession. But during the reign of his son Dahír, a few peaceful Muhammadan merchants, as the Arab version of the conquest asserts, who had been sent into Sind by the Khálifa Abdúl Málik to purchase female slaves and other articles of lawful commerce, were attacked by robbers, and either made prisoners or killed on the spot. One or two of the injured merchants alone escaped to make their complaints to the Khálifa; and the latter readily embraced so excellent an opportunity of spreading the faith of Islám into the delta of the Indus. He died before the army collected for the purpose could invade Sind; but his son despatched Muhammad Kásim Sakifí to carry out the conquest about 711 A.D.

Muhammad Kásim set out from Shiráz with a large force, and first captured the seaport of Debal, identified by some with MANORA, and by others with TATTA. Thence he marched upon Nerankot, the

modern Haidarābād; and after its capitulation he next took the strong fortress of Schwān. Returning to Nerankot, the Musalmān leader proceeded to cross the Indus, whose main channel then flowed east of the city, and successfully engaged the army of Rājā Dahir. The native prince was slain at the fort of Rāwar, while his family were carried away prisoners by the conqueror. In 713, Muhammad Kāsim arrived at the capital, Aror, which was taken; and then advanced upon MULTAN (in the present Punjab Province), which submitted with an immense treasure. The end of the first great Musalmān conqueror of India remains uncertain; but it seems probable that he was tortured to death with the sanction of Khālifa Sulāman. Sind remained thenceforward, with scarcely a break, in the hands of the Muhammadans.

On the extinction of the Ummayyide dynasty of Khālifas (750 A.D.), and the accession of the Abūssides, the Indus delta passed to the new rulers, and the power of the Musalmāns began to attract the attention of the native princes on the northern frontier of Hindustān. But the hold of the Khālifas upon this distant Province grew slowly weaker, and became virtually extinct in 871 A.D. Two native kingdoms raised themselves at Mūltān and Mānsura. The former comprised the upper valley of the united Indus as far as Aror; the latter extended from that town to the sea, and nearly coincided with the modern Province of Sind. The country was then well cultivated; and Aror, the capital, surrounded by a double wall, is said to have almost equalled Mūltān in size, and to have possessed a considerable commerce. The Arab princes apparently derived but a very small revenue from Sind, and left the administration wholly in the hands of natives. Arab soldiers held lands on military tenure, and liberal grants provided for the sacred buildings and institutions of Islām. Commerce was carried on by caravans with Khorāsān and Zābulistān, and by sea with China, Ceylon, and Malabar. The Arabs also permitted the native Sindians the free exercise of their own religion to a considerable extent.

When Mahmūd of Ghaznī invaded India in 1019, Sind was ruled by a Governor who nominally represented the Khālifa, Kādīr Billah Abūl Abbas Ahmad. After the capture of Mūltān and Uchh, Mahmūd sent his Wazīr, Abdūr Razā, to conquer Sind, which the Wazīr accomplished in 1026. But six years later, Ibn Sūmar, Governor of Mūltān, laid the foundation of the Sūmra dynasty in Sind, at first apparently as a titular vassal of the Ghaznevide monarchy. In 1051, however, if not before, the Sūmra kings made themselves completely independent, and extended their possessions as far as Nasarpur, 26 miles south-east of Hāla. Under Khaffī, who made Tatta his capital, the dynasty attained its greatest power, and restrained with success the wild tribes of the western frontier. From the death of Khaffī, however, the Sūmra dynasty lost its prestige; and in the reign of Urrah Mehl (1351), the Sama tribe, a

body of non-Musalmán immigrants from Cutch (Kachchh), conspired against and killed the Musalmán king, and placed Jám Unar, one of themselves, upon the throne of Sind.

The Samas were either Buddhists or Hindus, and had their capital city at Samanagar on the Indus, identified with the modern town of Sehván; but they resided chiefly at Tatta or at Samui, under the Makli Hills, 3 miles north-west of the former town. They were undoubtedly Rájputs of the Jadava stock, and they became Muhammadans not earlier than 1391 A.D. Jám Unar, first of the line, reigned three and a half years, but does not seem to have held all Sind under his sway, as the Hákins kept Bukkur and its neighbourhood on behalf of the king of the Turks. Junah, the second king, captured Bukkur, and the Hákins retreated to Uchh. Under his successor, the forces of the King of Delhi retook Bukkur, and carried the Jám and his family as prisoners to Delhi. In 1372, Firoz Tughlak invaded Sind, and compelled the ruling prince to tender a nominal allegiance. The Sama line consisted in all of 15 kings, the last of whom was supplanted by the Arghuns.

The Arghún dynasty traced its origin to Changiz Khán, and commenced its rule in Sind in 1521. The first prince of the line, Sháh Beg Arghun, marching down from Kandahár, defeated the Sama army in 1520, and sacked Tatta, the capital of Jám Firoz Sama. By a subsequent agreement, the Jám retained all Sind between Sukkur and Tatta, while the Sháh took the region north of Lakhi. But the Samas soon after repudiated this agreement; and a battle fought at Talti, near Sehván, resulted in their utter defeat and the secure establishment of the Arghun power. Sháh Beg afterwards captured the fort of Bukkur, and rebuilt the fortifications with bricks taken from the ancient stronghold of Aror. Just before his death in 1522, he made preparations to attack Gujarát, but did not live to accomplish his purpose. Sháh Beg was not only a bold soldier, but also a learned Musalmán theologian and commentator. His son and successor, Mirza Sháh Husain, finally drove Jám Firoz from Tatta to Cutch, and at length to Gujarát, where he died. Sháh Husain severely punished his subject tribes for internal wars, and sacked the towns of Múltán and Uchh, as well as the fort of Diláwar.

During Sháh Husain's reign, the Mughal Emperor Humáyún, being defeated by the Afghán, Sher Sháh, in 1540 A.D., fled to Sind, where he endeavoured unsuccessfully to take the fort of Bukkur. After a short stay in Jodhpur, Humáyún returned to Sind by way of Umarkot in 1542, and again attempted without success to conquer the country. Sháh Husain died childless in 1554, after a reign of thirty-four years, and with him ended the Arghun dynasty. A short-lived line, the Tarkhán, succeeded for a few years; but in 1592, the Mughal Emperor

Akbar, who was himself born at Umarkot during the flight of his father Humáydín, defeated Mirza Jání Beg, ruler of Tatta, and united Sind for the first time with the Musalmán Empire of Delhi. The Province was incorporated under Akbar's organization in the Subah of Múltán.

During the flourishing period of the Mughal Empire, the general peace of the great monarchy extended to Sind, and but few historical events of importance occurred for the next century. In the interval, however, between the consolidation of the Empire by Akbar, and the dismemberment which followed on the invasion of Nádir Sháh, the Dáúdputras or sons of Dáúd Khán, rose to distinction. Weavers and warriors by profession, they led a wild and wandering life, at Khánpur, Taráí, and throughout the Sukkur country. After a long and sanguinary conflict with the Mahars, a race of Hindu origin, the Dáúdputras succeeded in establishing their supremacy over Upper Sind, and founded the town of Shikárpur. From the extinction of the native dynasties, Tatta had formed a scene of constant contention between neighbouring governors, till Jahángír put a stop to the strife by appointing removable lieutenants to administer the outlying Provinces of the Empire, and so checked the growth of a hereditary vicerealty in Sind.

Towards the end of the 17th century, however, another race, closely allied to the Dáúdputras, rose to power in the lower Indus valley. The Kalhoras traced their descent historically to Muhammad of Kambáthá (1204 A.D.), and more mythically to Abbas, the uncle of the Prophet. About 1558, the family rose into notice through the sanctity of one Adam Sháh, the chief of a large sect of mendicants in Chánduka. The Governor of Múltán attacked the religious leader, dispersed his followers, and put to death Adam Sháh himself. The Fakírs descended from the family long lived a life of warfare against the Mughal lieutenants; until at length in 1658, under Názir Muhammad Kalhora, they began successfully to oppose the imperial troops, and to organize themselves into a regular government. At length, about 1701, Yár Muhammad Kalhora, assisted by the Sirai or Talpur tribe, seized upon Shikárpur, where he fixed his court, and obtained from the Emperor Aurangzeb a grant of the Deraját, together with a regular title (Khuda Yár Khán) under the imperial system. By the year 1711, Yár Muhammad had further overrun the Kandáro and Lárkhána tracts, as well as the country around Sukkur.

On the death of Yár Muhammad Kalhora in 1719, his son Núr Muhammad succeeded to his territories, and conquered the Nhár Sub-division from the Dáúdputras. Sehván and its dependencies also fell under his rule, and his territory extended from the Múltán border to Tatta. The fort of Bukkur, however, did not come into the possession of the Kalhoras till 1736. With this exception, Núr Muhammad's

authority stretched from the desert to the Balúchí Mountains. During his reign, the Talpur tribe of Balúchís, the last native rulers of Sind, first came into notice in the person of Mír Bahrám, an able officer of the Kalhora kings. When Nádir Sháh, the Persian conqueror, swooped upon Delhi in February 1739, and broke down the decaying Mughal organization, all the Provinces west of the Indus were detached from the Empire and incorporated with the Persian dominions. Tatta and Shikárpur formed part of the territory thus ceded to Nádir Sháh.

Shortly after his return to Kábul, Nádir set out upon a second expedition against Sind and the Punjab, in order to repress his troublesome vassal, Núr Muhammad. Two years earlier, the Kalhora prince had persuaded Sádík Alí, Subahdár of Tatta, to make over that Province in return for a sum of 3 *lákhs*; and this transaction apparently aroused the anger of his new suzerain. On Nádir's approach, Núr Muhammad at first fled to Umarkot, but afterwards surrendered with the loss of Shikárpur and Sibi, which the Sháh made over to the Dáúdputras and Afgháns. An annual tribute of 20 *lákhs*, with the honorary compensations of a high-sounding title (Sháh Kulí Khán), was imposed upon the Kalhora prince.

On Nádir Sháh's death, Sind became tributary in 1748 to Ahmad Sháh Duráni of Kandahár, who conferred on Núr Muhammad the new title of Sháh Nawáz Khán. In 1754, the tribute being in arrears, Ahmad Sháh advanced against Sind, and Núr Muhammad fled to Jaisalmer, where he died. His son, Muhammad Murád Yáb Khán, managed to appease the ruler of Kandahár, and obtained a confirmation of his rank and power. He founded the town of Muráddábad. In 1757, his subjects rose against his oppressive government and dethroned him, placing his brother, Ghulám Sháh, upon the throne. The new prince, after two years of internal dissension, made his own position secure; and in 1762 he invaded Cutch (Kachchh), fighting the sanguinary battle of Jhana. Next year he resumed operations against Cutch, and took the seaports of Basta and Lakhpat on the Indus. In 1768 he founded the city of Haidarábád on the ancient site of Nerankot, and made it his capital till his death in 1772. During the early part of his reign, in 1758, the East India Company established a factory at Tatta. Sarfaráz Khán, his son and successor, discouraged the Company's operations, and the factory was eventually withdrawn in 1775. Soon afterwards, the Balúchís deposed the chief, and two years of anarchy followed.

In 1777, Ghulám Nabí Khán, a brother of Ghulám Sháh, succeeded in obtaining the throne. During his reign, Mír Bijar, a Talpur chief, rose in rebellion; and in the battle between them the Kalhora prince lost his life. Abdúl Nabí Khán, his brother, succeeded to the throne,

many handsome buildings, of which their own tombs are the most remarkable.

The first connection of the British with Sind took place as early as 1758, in the matter of the abandoned factory at Tatta. In 1799, a commercial mission was sent to Sind, to conduct business between our Government and the Talpur Mírs, but it ended unsatisfactorily. The agent resided from time to time at Tatta, Sháhbandar, or Karáchi, and endured numerous indignities, until at length he received a peremptory order from the Mírs to quit their territory. The East India Company took no notice of this insult. In 1809, an arrangement was effected between the Mírs and our authorities, mainly for the purpose of excluding Frenchmen from settling in Sind.

In 1825, the Sindi tribe of Khosas made incursions into Cutch, and a military demonstration became necessary as a preventive measure. In 1830, Lieutenant (afterwards Sir Alexander) Burnes, after many delays and threats on the part of the Mírs, was permitted to follow up the course of the Indus, taking with him presents from the King of England to Ranjít Singh at Lahore. The river was then entirely unexplored, and the obvious object of the mission was the collection of information for political purposes. Two years later, Colonel Pottinger concluded a treaty with the Mírs for the advancement of commerce, by which traders and merchants were permitted to use the roads and rivers of Sind, though no Englishman might settle in the country. The Khairpur Mírs ratified this treaty, after their kinsmen at Haidarábád. In 1835, Colonel Pottinger obtained leave to survey the sea-coast of Sind and the delta of the Indus; yet trade did not enter the river, and the Mírs clearly mistrusted the intentions of their powerful neighbours.

In 1838, the first Afghán war necessitated the despatch of British troops to join the main army by way of the Indus, in spite of a clause in the treaty expressly forbidding the employment of the river as a military highway. Lord Auckland considered that so great an emergency overrode the text of the agreement, and declared that those chiefs who showed themselves unwilling to assist the British in such a crisis would be deprived of their possessions. In December of that year, a large force under Sir John Keane landed in Sind, but found itself unable to proceed, owing to the obstacles thrown in its way by the Mírs in supplying stores and carriage. After a threat to march upon Haidarábád, Sir John Keane at length succeeded in continuing his course. Owing to this hostile demeanour, a reserve force was despatched from Bombay in 1839, to take up its station in Sind. The Balúchí garrison at Manora, near Karáchi, endeavoured to prevent it from landing, and the British accordingly found it necessary to occupy that fort.

A treaty was afterwards, in 1839, concluded with the Haidarábád

Mírs, by which they agreed to pay 23 *Lakhs* to Sháh Shúja, in commutation of all arrears of tribute due to the Afgháns; to admit the establishment in Sind of a British force not exceeding 5000 men, the expenses being defrayed in part by the Mírs themselves; and finally, to abolish all tolls upon trading boats on the Indus. The Khairpur Mírs concluded a similar treaty, except as regards the subsidy. The English then took possession of the fort of Bukkur, under the terms of the engagement. By careful conciliatory measures, the British representatives secured the tranquillity of the country, so that the steam flotilla navigated the Indus unimpeded. Núr Muhammad, senior Mír, died in 1841, and the Talpur Government passed to his two sons, conjointly with their uncle, Nasir Khán.

In 1842 Sir Charles Napier arrived in Sind, with sole authority over all the territory on the Lower Indus. New conditions were proposed to the Mírs, owing to delay in payment of the tribute, these terms including the cession of Karáchi, Tatta, Sukkur, Bukkur, and Rohri. After some delay and a slight military demonstration, the treaty was signed in February 1843. But the Balúchís composing the Sindian army did not acquiesce in this surrender of independence; and shortly afterwards they attacked the Residency, which stood near the Indus, a few miles from Haidarábád. Major Outram and his small suite, after defending the building for a short time, found themselves compelled to retreat to a steamer then lying in the river. He soon after joined Sir C. Napier's force. On the 17th of February, Napier found the Mír's army, 22,000 strong, posted on the Fuleli river, near MEEANEE (Míáni). He gave them battle with only 2800 men of all arms, and 12 pieces of artillery, and gained a complete and brilliant victory. The Balúchí loss amounted to about 5000 men, while that of the British did not exceed 257, of whom 19 were officers. Shortly after, the chief Mírs of Haidarábád and Khairpur surrendered as prisoners of war, and the fort of Haidarábád was captured, together with the Mírs' treasure, computed at about £1,000,000 sterling. In March, Napier received reinforcements from Sukkur, and went in search of the enemy, with 5000 men. He found the Balúchí army, 20,000 strong, under Sher Muhammad of Mírpur, in a strong position near Dabo. After a desperate resistance, the Sindians fled in disorder, their leader, Sher Muhammad, retreating to the desert. Soon afterwards, our troops occupied Mírpur, Khás, and Umarmot. Sind was declared a conquered country, and annexed to the British dominions.

The Talpur family thus ceased to be a ruling power, after a sovereignty of fifty-three years. The Mírs were removed successively to Bombay, Poona, and Calcutta; but in 1854, Lord Dalhousie allowed them to return to Sind and take up their residence at Haidarábád. Under the Talpurs, the government of Sind consisted of a rude

military feudalism. The Mírs themselves had little education or refinement, and lived in primitive Balúchí simplicity, their extravagant propensities being shown in their fondness for horses, arms, and field sports. Their sole aim was to hoard up wealth, oppose all improvements, and enjoy themselves after their own fashion.

Immediately after the annexation, Sir C. Napier was appointed the first British Governor; while a pension of $3\frac{1}{2}$ *lákhs*, together with lands in *jágír*, was distributed amongst the deposed Mírs. The judicial and revenue systems underwent a speedy remodelling; and the Province was divided into extensive Collectorates. Since the British annexation, the chief events in Sind have consisted of commercial improvements, including especially the immense harbour works at KARACHÍ, which have rendered the modern capital one of the most important seaports of Western India. Under the Commissionership of Sir Bartle Frere (1851-59), the Province took most important steps in the direction of mercantile progress; and at a later date, the construction of the Indus Valley portion of the Sind, Punjab, and Delhi Railway, from Karachí to join the Punjab line at Múltán, has already contributed greatly to the prosperity of the country.

Population.—Sind is a very sparsely populated Province even at the present day. No statistics are available as to the number of inhabitants under its native rulers, though a probable conjecture sets it down in the early part of this century at not more than 1,000,000 persons, or only about 16 to the square mile. A Census taken in 1856, exclusive of the territory of Mír Alí Murád Khán, or Khairpur State, returned the total population at 1,772,367 persons. An accurate enumeration undertaken in 1872 gave the total, again excluding Khairpur territory, at 2,203,177; thus showing a gain of 430,810 persons, or 26 per cent, in the fifteen years. The Census of 1881 disclosed a total population of the British Districts of 2,413,823, showing a further increase of 210,646, or 9·56 per cent., in the nine years between 1872 and 1881.

The main feature of this increase, which is found in every District of the Province, seems to be the influx of foreigners, chiefly from the adjacent territories of Balúchistán and the Punjab. In Karachí, as in the city of Bombay and other large seaports, the indigenous population is in the minority. A good deal of the increase in the more rural parts of the Province has been attributed to the general development of the people, under the influence of prosperous harvests and improved means of transport to market. A part of the increase, however, is only apparent, and is due to more correct enumeration, especially in the case of females. The rate of increase in the towns has been generally higher than in the surrounding country. Karachí owes its prosperity to the development of its sea trade, especially since the opening of direct railway communication with Upper India and the western frontier.

Shikárpur has also profited in the same manner, and the trading centre of Sukkur has doubled its population since 1872.

The results of the Census of 1881 may be summarized as follows:—Area of British Districts, 48,014 square miles. Population, 2,413,823 (males 1,316,830, and females 1,096,993); number of towns 12, and of villages 3405; number of occupied houses 433,584, and of unoccupied 149,701. From these the following averages are deduced:—Persons per square mile, 50·3; towns and villages per square mile, 0·07; houses per square mile, 12·0; persons per house, 5·5. The population, which is extremely scattered in all parts of the Province, gathers thickest in Shikárpur, 85·2 per square mile; and Haidarábád, 83·3 per square mile. In the Frontier District of Upper Sind, the average falls to 58. The extensive District of Karáchi, though it contains the capital town and largest commercial centre, has but 33·9 persons to the square mile; in Khairpur State, the average is only 21·1; and in the wide but desert expanse of the Thar and Párkár District, it does not exceed 15·9.

Classified according to sex, the native population in 1881 amounted to—males 1,314,391, and females 1,096,026. The European element was represented by 3127 persons, namely, males 2279, and females 848. Eurasians numbered 279, namely, males 160, and females 119. Classified according to sex and age, of the entire population, exclusive of Khairpur State, there were returned—under 15 years, boys 546,005, and girls 441,574; total children, 987,579, or 40·9 per cent.: 15 years and upwards, males 770,825, and females 655,419; total adults, 1,426,244, or 59·1 per cent.

Religion and Caste—Classified by religion, the Muhammadans number 1,887,204, or 78·5 per cent. of the total population; Hindus, 305,079, or 12·6 per cent.; Sikhs, 126,976, or 5·3 per cent.; non-Hindu aborigines, 86,040, or 3·5 per cent.; Christians, 6082; Jains, 1191; Parsís, 1063; Jews, 153; Brahmós, 26; and Buddhists, 9. The Muhammadans, who form the bulk of the inhabitants, fall naturally into two classes—the native Sindís, and the naturalized tribes, such as Sayyids, Afghans, Balúchís, Africans, and Khwájás. The Muhammadan population by race, as distinguished from descendants of converts, consisted of Sindís, 1,273,761, Balúchís, 409,012; Sayyids, 37,734; Shaikhís, 32,888; Patháns, 14,729, and 'others,' 119,080. According to sect, the Muhammadans were returned—Sunnís, 1,858,648; Shiás, 28,093; Wahábís, 174; and 'others,' 289.

The Sindís represent the original Hindu population, converted to Islám under the Ummayyide Khálifas. They are taller and more robust than the natives of Bengal, of dark complexion, and muscular frame. Their detractors represent them as idle, apathetic, and cowardly, addicted to drunkenness, and personally dirty; while their disinclina-

tion to truthfulness has given them a bad name amongst neighbouring tribes. On the other hand, they are quiet and inoffensive, kindly, faithful, and of unimpeachable honesty. In religion they are Sunnís. The Sindís are sub-divided into about 300 clans or tribes, but the caste system does not exist among them. The Sindí language belongs to the pure Neo-Sanskritic group, and contains far less of alien admixture than any of the cognate tongues. It stands closer to the old Prákrit than does either Maráthí, Hindí, or Bengálí; and it has preserved an immense number of grammatical forms which have dropped out of the other vernaculars. Three dialects of Sindí are distinguished in Upper and Lower Sind and in the Thar, respectively. The literature of the language consists mainly of translations from the Arabic, chiefly theological, and a few rude national ballads.

Among the races of foreign origin, the Sayyids were patronized by the Kalhora princes, who granted them several considerable estates; but the Talpurs proved less liberal. The Afgháns came originally from Khorásán, and now reside in the neighbourhood of Haidarábád and in Northern Sind. They far surpass the Sindís in personal appearance, strength, and courage. The Balúchís, wild mountaineers from the barren hills to the westward, settled in Sind under the Talpur dynasty, and received large *jágírs* in return for military services. They are fairer, more powerful, and hardier than the Sindís; they have genuine though peculiar ideas of honour; and they are brave soldiers, with a large share of national pride. On the other hand, they are grossly illiterate, rough in manners, drunken and debauched, violent and revengeful, and wholly addicted to coarse amusements. In religion they belong to the Sunní sect, though the Talpur Mírs, on their arrival in Sind, adopted the Shiá persuasion. About 80 clans are settled in the plains. The Africans represent the slaves of Sind, brought over by way of Maskat from Zanzibar or Abyssinia. Emancipated at the British annexation, they still marry, as a rule, within their own race, and remain inmates of their former masters' houses. A small body of Memons gather around Haidarábád, Schwán, and Karáchí. They are doubtless Hindus by origin, who became Musalmáns and emigrated to Sind during the Kalhora rule. They engage in trade, agriculture, and breeding camels. Many of them possess great learning, and they have done more than any other class to introduce religious knowledge into the Province. The Khwájas, a numerous body in Karáchí, are heterodox Musalmáns, carrying the Shiá doctrines to an extreme.

The Hindus occupy in Sind a position analogous to that of the Musalmáns in Hindustan. Few of them, apparently, belong to native families which have survived the long Muhammadan domination; they have generally immigrated from the Punjab in recent times, and retain their distinctive names, features, and religion. The Bráhmans comprise

two classes, which do not intermarry; and they are mainly confined to the large towns. One class, called *amils*, formed the principal clerks and writers in the time of the Mírs, and now of the British Government. They imitate the Muhammadans in their dress and manner of wearing the hair; and are in all a most intelligent class of the community. The lower castes are essentially similar to their brethren in the Punjab. The Sikhs reside in considerable numbers at Haidarábád, Schwán, and other towns. The Census of 1881 subdivided the Hindus by caste and social distinctions into—Bráhmans, 13,531; Rájputs, 10,534; Lohánás, 211,926; and 'others,' 69,088.

Among the Christians of the Province, 3198 were Roman Catholics, 2198 Protestants, and 686 of other Christian creeds. Adopting another principle of division, there were 3127 Europeans, 2676 native Christians, and 279 Eurasians.

As regards occupation, the Census of 1881 distributed the male population into six main groups:—(1) Professional class, including civil and military officials of every kind, 19,242; (2) domestic servants, inn and lodging-house keepers, 18,926; (3) commercial class, including bankers, merchants, carriers, etc., 31,239; (4) agricultural and pastoral class, including gardeners, 476,573; (5) industrial class, including all manufacturers and artisans, 147,225; and (6) indefinite and non-productive class, comprising labourers, male children, and persons of unspecified occupation, 623,625.

Of the 3417 towns and villages of Sind, 985 contain less than two hundred inhabitants; 848 between two and five hundred; 978 between five hundred and one thousand; 431 between one and two thousand; 97 between two and three thousand; 48 between three and five thousand; 22 between five and ten thousand; 3 between ten and fifteen thousand; 4 between twenty and fifty thousand; and 1 above fifty thousand.

KARACHI, the capital city, had a total population in 1881 of 73,560 persons; but its commercial importance is far greater than this total would seem to imply. SHIKARPUR, the great depôt of transit trade with the Bolán Pass and Khorásán, had 42,496; HAIDARABAD, the Talpur capital, 48,153. The other chief towns and places of interest include—AROR, the capital of Sind under its Hindu Rájás; BRAHMANABAD, a mass of extensive ruins of very great antiquity, near Sháhdádpur; the fortified island of BUKKUR, in the Indus; KETI, the port on the principal mouth of the Indus (2141 persons); KHAIRPUR, the capital of the State of the same name; KOTRI, the station on the Indus Valley Railway opposite Haidarábád (8922); LARKHANA, a considerable manufacturing town (13,188); ROHRI (10,224); SEHWAN (4524), the deserted port of SHAHBANDAR; SUKKUR, the great inland port of the Indus, and point of departure for the new line of rail to the Bolán Pass (27,389); TATTA, the old emporium on the seaboard

(8830); JACOBABAD, the chief military station of the Frontier District (11,352); KAMBAR (6133); GARHI YASIN (5541); and MATARI (5054).

Agriculture.—The total extent of cultivated land in Sind in 1881-82 amounted to no more than 2,121,072 acres, by far the greater portion of the Province being absolutely barren. There are two principal harvests—the *rabi*, sown in August, September, or October, and reaped in February, March, or April; and the *kharif*, sown during the floods of the Indus, in May, June, July, or August, and reaped in October, November, or December. The *rabi* consists of wheat, barley, gram, vetches, oil-seeds, indigo, hemp, and vegetables. The *kharif* includes the millets known as *bajra* (*Pennisetum typhoideum*) and *jodr* (*Sorghum vulgare*), the two chief food-grains in Sind, rice, oil-seeds, pulses, and cotton. The area under each staple in 1881-82 was as follows:—*Jodr*, 493,694 acres; *bajra*, 474,786 acres; rice, 518,210 acres; oil-seeds, 122,464 acres; wheat, 225,946 acres; cotton, 70,178 acres; barley, 10,630 acres; indigo, 5325 acres; tobacco, 9586 acres; and sugarcane, 2689 acres; pulses, 90,066 acres; gram, 22,039 acres; miscellaneous products, such as vegetables, fruits, etc., 75,459 acres. The distribution into harvests was as follows:—*Kharif*, 1,652,261 acres; *rabi*, 381,080 acres; intermediate or mixed, 87,731 acres.

The fruits common to the country include dates, plantains, mangoes, limes, oranges, pomegranates, citrons, figs, grapes, tamarinds, mulberries, and melons. The apples of Sind are famous for their fine quality. The British have introduced apricots, peaches, and nectarines, with excellent results. The methods of cultivation still differ little, if at all, from the primitive type. Rotation of crops is unknown, and the implements belong to the coarsest patterns. Two bullocks generally draw the clumsy native plough; while a heavy log of wood, with a man perched on either end, and drawn by four bullocks, does duty for a harrow.

The dry character of the soil, and the almost complete absence of rain, render irrigation a matter of prime importance to the cultivator. Though situated on the very verge of either monsoon, the Province derives no benefit from their rainfall; for the north-western monsoon, which deluges the hills of Baluchistan, extends no farther eastward than Karachi; while the south-western monsoon terminates at Lakhpat Bandar on the boundary of Cutch (Kachchh), as regularly as though it intentionally avoided the frontiers of Sind. Sometimes, indeed, for two or three years in succession, no rain falls in the Province. Under these circumstances, the Indus almost becomes to Sind what the Nile is to Egypt. Numerous irrigation canals, drawn from the main river or its tributaries, intersect the country in every direction. These canals are carried away from the raised bed of the stream in an oblique direction, so as to secure the greatest possible fall per mile. None of them have their heads where the bank is permanent, and none are deep enough to

draw off water except during inundation. The river must consequently rise several feet before the canals will fill. Many of the channels are old natural beds of the side branches, now deserted; and all have the appearance rather of rivers than of artificial cuts.

The canal system is very imperfect, owing to the want of permanent head-works, and the constant accumulation of silt. Cultivation is accordingly exposed to many risks, except in those lands where irrigation is always carried on by means of water-wheels; but as this method is expensive, the poorer cultivators prefer the inferior and precarious tillage of lands which can be directly flooded from the canals, where a small deficiency of water often entirely cuts off the whole crop. From the capricious nature of the water-supply, cultivation accordingly becomes a species of lottery, the cultivator being rich one season and a bankrupt the next. Too little or too much water, an early or a late supply, may destroy his only chance of a harvest. Owing to the frequent failures, agriculture is, on the whole, a poorly paid occupation; yet the peasantry prefer the gambling risk to steady and well-paid labour.

This precarious and uncertain cultivation renders the Sind peasantry an improvident and thriftless body. They are almost always in debt to the Hindu money-lenders, who often exact as much as cent. per cent. on their advances. The population is almost wholly engaged in agriculture, yet the Province does not usually produce much more than a sufficient quantity of food-grains for its own consumption, and considerable imports take place in years of scarcity.

The land tenures of Sind belong to extremely simple types. The landowners may be divided into three classes—large proprietors, a numerically small but very influential body; the holders of small estates, of a few hundred acres, answering to the middle-class gentry; and the peasant proprietors, a large body, paying revenue directly to Government, or to the alienee holding Government rights. The British authorities have upheld and fostered the rights of the smaller occupants against the encroachments of the *samindars*, thus encouraging the spirit of independence amongst the cultivating classes.

The total agricultural population of the Province of Sind in 1881 was returned at 496,134, giving an average of 18·2 acres of cultivable and cultivated land to each. The total agricultural population, however, dependent on the soil amounted to 1,340,239, or 55·52 per cent. of the population of the Province. Total amount of Government assessment, including local rates and cesses on land, £680,022, or an average of 2s. 0½d. per cultivated acre.

Commerce and Communications.—The trade of Sind centres almost entirely upon the great seaport of Karachi, a creation of British rule, and now the chief port of entry and exit for the Punjab. The total value of the imports into Karachi in 1881–82 amounted to £3,759,708;

while those into the whole Province, excluding the capital, were only £32,505. In the same year, the exports from Karáchi amounted to £3,959,333, and from the remainder of Sind to £85,314. The staple articles of export are raw cotton, wool, and grain of various kinds.

Karáchi has long formed the chief outlet for the cotton crops of Sind and the Punjab. The Province at one time actually imported the material necessary for its own petty domestic manufactures from Cutch (Kachchh) and Gujarát, to the amount of several thousand *maunds* annually. About 1840, however, extensive cotton plantations sprang up in Sind itself. In 1861, exports first began; and in 1866 they had reached the total of 28,128,900 lbs. A large portion of this amount, however, came from the Punjab. The home yield at present averages from 18,000 to 20,000 bales annually; though it is calculated that the Province still contains 3,000,000 acres of uncultivated land capable of growing the plant. The remainder consists of Punjab cotton, from the Districts of Múltán, Lahore, and Amritsar; but it bears in European markets the name of 'Sind,' from its place of shipment. Since 1870, a large trade in raw cotton has sprung up with China. The total export of raw cotton in 1882 amounted to 27,802,384 lbs.

The wool of Sind forms a staple of almost equal importance; though the larger portion of the quantity exported comes, not from the Province itself, but from Ferozpur District in the Punjab, and from Afghánistán and Balúchistán. The supply from the latter countries is brought into the market in a dirty condition. The value of wool exported from Karáchi in 1873-74 was £634,874; and in 1881-82, £739,673.

Quite recently a very important and increasing trade in wheat with Europe has sprung up. The supply comes almost entirely from the Punjab. The following table shows the exports of wheat from Karáchi for the twelve years ending 1883-84:—

Year.	Quantity	Value	Year	Quantity.	Value.
	Cwts.	£		Cwts.	£
1872-73, . . .	168,966	75,394	1878-79, . . .	22,333	12,858
1873-74, . . .	797,639	387,314	1879-80, . . .	274,764	153,462
1874-75, . . .	141,872	61,578	1880-81, . . .	169,465	86,757
1875-76, . . .	306,063	129,469	1881-82, . . .	1,852,334	948,243
1876-77, . . .	455,240	195,416	1882-83, . . .	2,732,275	1,281,238
1877-78, . . .	607,470	332,109	1883-84, . . .	4,372,832	1,952,647

NOTE.—In 1880, through railway communication was completed between Karáchi and the Punjab.

Extensive beds of bay salt occur on the Sirganda Creek, an eastern arm of the Indus, said to be capable of supplying the consumption of the whole world for a century. The deposit is remarkably pure, and consists of large crystals. Excise restrictions long prevented it from competing with other Indian salts, but these have now been removed.

The great harbour works of KARACHI are more fully described under that article. Communications are carried on by means of the Indus, by numerous excellent roads, by the Sind, Punjab, and Delhi Railway, and by the Sind-Pishin Railway. The river, the great source of wealth to the Province, is under the charge of a special Government department, the Indus Conservancy, which removes all obstructions to navigation as soon as they appear. The Sind, Punjab, and Delhi Railway runs from Karáchi to Delhi, a distance of 1169 miles, its main object being to facilitate the transmission of goods from Karáchi to Northern Sind and the Punjab, or *vice versa*; thus saving the long detour by sea and river between Karáchi and Kotri, *via* the Indus Delta. The Indus at Sukkur has not yet been bridged, although a railway bridge is now (1886) in course of construction. The stone work of the bridge has been finished, and its final completion only awaits the arrival of the iron work for the large span from Bukkur island to Rohri. At present, from Rohri, on the opposite bank to Sukkur, the railway proceeds into Baháwalpur State, and so joins the Punjab system at Múltán. From the Ruk Station on the Sind, Punjab, and Delhi Railway, the Sind-Pishin Railway is under construction to Quetta; about 152 miles have been finished and opened, but only 40 miles of this are in the Province of Sind. The submarine cable, laid in 1864, connects Karáchi with Fao in Turkish Arabia, and thence by Turkish Government telegraph with Constantinople and Western Europe. Another line runs from Karáchi along the Makrán coast, and thence by submarine cable to Bushire in Persia, connecting ultimately with the Russian system, as well as with the Siemens line to Berlin and England.

Administration.—Sind forms a Province under a Commissioner, subordinate to the Government of Bombay. It contains three Collectorates—those of KARACHI, SHIKARPUR, and HAIDARABAD; together with the two Districts of THAR AND PARKAR and the UPPER SIND FRONTIER, each under a Deputy Commissioner, besides the Native State of KHAIRPUR. The total imperial revenue of the Province in 1881–82 amounted to £809,311, of which £482,497 was derived from land revenue, and £8253 from a canal maintenance rate levied upon *jágirdárs* and from miscellaneous items of irrigation revenue. The other sources of revenue were—forests, £40,131; excise, £91,936; judicial, £9167; registration, £2965; stamps, £38,416; postal, £49,968; telegraph, £12,392; licence-tax, £14,846; customs, £53,949; miscellaneous,

£2555; and *ghat*-tax levied only in Thar and Pákar District, £2236. The local revenue in the same year amounted to £131,521, arising mainly from public works and municipal funds. The land-tax ordinarily forms two-thirds of the net revenue of Sind; but remissions are constantly necessitated by droughts, floods, or bursting of embankments. In spite of these drawbacks, however, the revenue has steadily increased under British rule. The cost of clearing canals forms one of the most important items of public expenditure.

The total police force of the Province consisted in the year 1881 of 4180 officers and men; but the area includes so large an extent of desert, that any general statement of numbers per square mile would only mislead. In Haidarábád District, where population is thickest, there is 1 policeman to every 12 square miles and to every 1019 inhabitants; in Karáchí District, including the capital, there is 1 policeman to every 9 square miles and to every 326 of the population; while in the desert District of Thar and Pákar there is only 1 policeman to every 22 square miles and to every 357 inhabitants. Number of civil judges, 33; and of stipendiary magistrates, 104.

Education has made rapid and satisfactory progress in Sind since the British annexation. In 1859-60, the Province contained only 20 Government schools. The total number of Government schools in 1873-74 amounted to 213, of which 26 were for girls. The number of pupils was 12,728, of whom 8531 were Hindus and only 4139 Muhammadans. In 1883-84, the schools under the Education Department had increased to 340, with 23,273 pupils. The number of indigenous schools at either date cannot be accurately ascertained. The Musalmán population show but little interest in education, and specially neglect that of their daughters. Haidarábád and Sukkur each possess a normal school, and the former town has also an engineering school. Among private institutions, the European and Indo-European schools at Karáchí, and the missionary schools in that town and Haidarábád, teach up to the matriculation standard of the Bombay University. The Census of 1881 returned 27,413 males and 2201 females as under instruction, besides 76,983 males and 2849 females able to read and write but not under instruction. There are four printing presses at Karáchí, and two at Shikárpur.

Medical Aspects.—Owing to its prevalent aridity, and the absence of the monsoons, Sind ranks amongst the hottest and most variable climates in India. The average temperature of the summer months is 95° F., and that of the winter months 60°. But the thermometer frequently rises in summer to 110° and occasionally to 120°; while in winter it falls at night a few degrees below freezing-point, and ranges even in the day-time from 40° to 80°. No other part of India has so long a continuance of excessively hot weather, owing to

the deficiency of rain. The climate on the sea-coast, however, is much more equable in temperature than in Upper Sind; and Karachi, the great centre of European population, enjoys a strong sea breeze, which blows day and night from April to October. In Northern Sind, the extremes of temperature are strongly marked. The thermometer at Shikarpur often sinks below freezing point in winter, and ice forms as late as February; yet in summer, for weeks together, the readings at midnight do not fall below 100° F. This great and prolonged heat, coupled with the exhalations arising from the stagnant pools left after the annual inundation, produces a fatal fever and ague. The natives suffer severely from its effects, and British troops have often experienced a terrible mortality. The other prevailing diseases include small-pox and cholera. The latter complaint has often appeared in epidemic form, and wrought great mischief in the country districts; but at Karachi, its ravages have lately been averted by the excellent sanitary precautions taken by the British authorities. Five civil surgeons are stationed respectively at Karachi, Haidarabad, Sukkur, Shikarpur, and Jacobabad, and an apothecary at Kotri. Numerous charitable dispensaries have been established in all the chief towns; total number of patients treated in 1883-84 in the several hospitals and dispensaries, 195,422, of whom 5372 were in-door patients. Vaccination has made satisfactory progress, no opposition being raised except amongst the Hindu population. In 1873-74, the Government vaccinators operated upon 105,587 persons.

Sindewáhi (*Sindwari*)—Town in Brahmapuri *tahsil*, Chándá District, Central Provinces; situated in lat. 20° 17' N., and long. 79° 42' E., 16 miles north of Mál. Population (1881) 4569, mostly Tehngas. Hindus number 3941; Muhammadans, 56, Jains, 15; and non-Hindu aborigines, 557. A fine tank 3 miles north-east of the town irrigates a wide extent of rice and sugar-cane fields. Sindewáhi manufactures cotton cloth and bangles, which are exported; and possesses some trade in raw cotton, grain, and sugar. Government school; police outpost.

Sindgi.—North-eastern Sub-division of Bijápur District, Bombay Presidency. Area, 812 square miles. Population (1881) 72,650, namely, males 36,466, and females 36,184, occupying 14,745 houses in 141 villages. Hindus, 63,027, Muhammadans, 9289; and 'others,' 334. Except some villages on the Bhíma river, the east of Sindgi is a rough rocky plain, with frequent, and, in some cases, abrupt undulations. It is scantily cultivated, treeless, and monotonous. The portion of the Sub-division on the banks of the Bhíma to the north and east is a black-soil plain, separated by long, low, step-like risings of trap. The soil is mostly formed from the wearing of the trap and laterite, with patches of grey and dark red and sometimes sand. The plain is well tilled, and, along the river banks, dotted with rich villages. In the south, the part watered by the Don river is the best cultivated portion of the Sub-

division. The supply of water is scanty. Of the total area of 812 square miles, 48 square miles are occupied by alienated villages. The remainder contains 389,687 acres of Government and 78,787 acres of alienated cultivable land; 16,415 acres of uncultivable land; 44 acres of forests; and 3356 acres of village sites, roads, and rivers. In 1881-82, 275,625 acres were under actual cultivation; cereals and millets occupied 206,378 acres; pulses, 8503 acres; oil-seeds, 18,779 acres; fibres (cotton), 40,208 acres; and miscellaneous crops, 1757 acres. In 1883 the Sub-division contained 2 criminal courts; police circles (*thānds*), 7; regular police, 46 men; village watch (*chaukidārs*), 502. Land revenue (1882), £18,823.

Sindgi.—Chief village of Sindgi Sub-division, Bijápur District, Bombay Presidency; situated 35 miles north east of Bijápur town. Population (1881) 3154. In December 1824, a band of insurgents led by a Bráhmaṇ, Devákar Dikshit, marched on Sindgi, captured the fort, and plundered the town. In 1866 the fort was dismantled. Dispensary.

Sindhiapura.—Petty State of Rewa Kántha, Bombay Presidency. Area, 4 square miles. The chief is named Chauhán Jitabáwa. Estimated revenue, £200; of which £5, 14s. is paid as tribute to the Gáekwár of Baroda. Owing to the insanity of the chief, the estate has been under direct British management since 1870.

Sindhorá.—Village in Benares *tahsil*, Benares District, North-Western Provinces; situated in lat. 25° 32' 13" N., long. 82° 58' 28" E., 16 miles north-north-west from Benares city. Population (1881) 1985, principally Bráhmans, Kandu Baniyás, and Chamárs. Large mart for grain and cloth; small manufacture of sugar.

Sindí.—Town in Wardhá *tahsil*, Wardhá District, Central Provinces; situated in lat. 20° 48' N., and long. 78° 56' E., 20 miles east of Wardhá town; and a station on the Great Indian Peninsula Railway. Population (1881) 4644, chiefly weavers and cultivators. Hindus number 3970; Muhammadans, 502; Jains, 148; and non-Hindu aborigines, 24. Manufactures—coarse cotton cloth, oil, bangles, and shoes. A market is held every Thursday and Friday. Sindí has a school, a dispensary, and a storage yard for cotton near the railway station.

Sindkher (*Sindkhed*).—Chief town of Sindkher *parganá*, Buldáná District, Berar. Lat. 19° 57' N., long. 76° 10' E. Population (1881) 2695. According to one tradition, the town was founded and named about 1000 years ago by a king Sinduráur; according to another, it takes its name from Sidha Khetak, 'village of saints,' an unbroken line of whom are said to have lived here since the foundation of the place. The *parganá* of Sindkher was granted in *jágír* to the Kázi of the town about 1450 A.D.; who afterwards gave it over voluntarily to the Jáduns,

the head and founder of whom was Lakha Raja, at first Kanwa in North Hindustan. Since then Sindkher has been regarded as the chief seat of this family, who subsequently rose to much fame and power. The *dar* of the *pargana* was held by the Jádava for about 100 years, but was then restored to the Rájá of the day by Mardán Ali Khán, a nobleman who came to Sindkher on a commission from the Delhi Government. The half-finished fort still stands north-west of Sindkher; it is about 150 yards square. The temple of Nibhantheswar to the south-west is supposed to be the oldest structure built by Hemar Panth; it bears an inscription, which is, however, nearly effaced, being several feet under water in the tank near the temple. Several palaces, such as the Mahabágh, Mahakál, the Desmukh's residence, and three or four large wells built by the Jádava, attest the magnificence and prosperity of the town in their time. In one of the frequent transfers from the Nizám to the Maráthas, Sindkher fell to Sindhua, who held it for nearly sixty years. It was restored to the Nizám in 1803. Bájí Ráo Peshwa encamped at Sindkher for some days in 1818, when the British troops were on his track. In 1804, General Wellesley (Wellington) wrote: 'Sindkher is a nest of thieves; the situation of this country is shocking; the people are starving in hundreds, and there is no Government to afford the slightest relief.' The decline of the town was hastened by marauders, whose names—Mohan Singh, Budlam Sháh, and Gházi Khán—are yet remembered with terror. Of the once extensive irrigated gardens of Sindkher, only a few fruit-trees survive.

Sindkhera.—Town in Virdel Sub-division, Khándesh District, Bombay Presidency; situated in lat. $21^{\circ} 17' 30''$ N., and long. $74^{\circ} 50'$ E., 24 miles north of Dhulia. Population (1881) 4295. Head-quarters of Virdel Sub-division. Municipal income in 1883-84, £141; incidence of taxation per head of population, 5½d. Post-office.

Sindurjana.—Town in Amráoti District, Berar.—See SENDURJANA.

Sindwa.—Village and fort in Central India; situated in lat. $21^{\circ} 40'$ N., and long. $75^{\circ} 20'$ E. (Thornton), on the route from Mhow to Bombay, 90 miles south-west of the former town and 274 north-east of the latter. It lies 9 miles north of the Sindwa Ghát, a somewhat steep but much frequented mountain pass, leading from the highlands of the Sátúra range to the valley of the Tápti in Khándesh. On the south side, Sindwa is a strong square fort with a front of about 265 yards, most of it built of fine cut stone and mortar. It had nine round towers, one at each angle, as well as one in the centre of each curtain. Four gateways were protected by strong mud outworks. A dry ditch of no great size runs along the north-east and south faces. The town inside the walls has a mud fort in its centre. The grand entrance on the south consists of a very strong gateway flanked by two large round

towers, with a commanding terrace and curtain running between. Wide ramparts surround the fort, with several guns of different sizes. One or two large reservoirs, well provided with water. Ceded to the British Government by Holkar under the treaty of Mandeswar (1818); but restored to him upon the condition of his building a bridge over the Gohi river.

Singa.—Mountain pass in Bashahr State, Punjab; leading across the Himálayan range, which bounds Kunáwár to the south. Lat. $31^{\circ} 15'$ N., long. $78^{\circ} 29'$ E. Stated by Thornton to be open from May till the middle of August, but impracticable at other times from the depth of the snow. Elevation above sea-level, between 16,000 and 17,000 feet.

Singáílílá.—Hill range in Dáryjiling District, Bengal. An immense spur, 60 miles long, stretching south from Kánchanjálgá to the plains of India, and separating Sikkim from East Nepál. Lat. $27^{\circ} 1'$ to $27^{\circ} 14'$ N., and long. 88° to $88^{\circ} 2'$ E. The waters from its west flank flow into the Támbar, and those from the east into the Great Ranjít, a feeder of the Tista. The highest peaks of the Singáílílá range are—PHALALUM, 12,042; SUBARGUM, 10,430; and TANGLU, 10,084 feet.

Singampunári.—Village in Tirupatúr *táluk*, Sivagangá *zamindárl*, Madura District, Madras Presidency. Population (1881) 5769, namely, Hindus, 5638; Muhammadans, 114; and Christians, 17.

Singánallúr.—Village in Coimbatore *táluk*, Coimbatore District, Madras Presidency, and a station on the south-western line of the Madras Railway; situated in lat. $12^{\circ} 9'$ N., and long. $77^{\circ} 16' 40''$ E. Population (1881) 7793, occupying 1632 houses. Hindus number 7743; Muhammadans, 15; and Christians, 35. The town and fort were destroyed by the Maráthás. The town has recovered under British rule, and is now a busy place.

Singanmat.—Principal peak in the Sankara range, Santál Parganá District, Bengal. Well known as a landmark to all the country round. As recently as 1867 a human sacrifice was made on the summit of this hill as a propitiatory offering by the Mál Paháriás of Sankara village.

Singapur (*Singapuram*).—Town in Jaipur (Jeypore) State, Vizagapatam District, Madras Presidency; situated in lat. $19^{\circ} 3' 19''$ N., and long. $82^{\circ} 43' 16''$ E., 21 miles west of Bissem Katak on the Banjara route to Nágpur. Population (1881) 999, chiefly Uriyás, dwelling in 229 houses.

Singárapet (*Singaricotta*, *Tingrecotta*).—Pass connecting the Districts of Salem and South Arcot, Madras Presidency.—*See* CHENGAMA.

Singaurgarh.—Hill fort in Damoh District, Central Provinces; situated in lat. $23^{\circ} 32' 30''$ N., and long. $79^{\circ} 47'$ E., 26 miles north-west of Jabalpur city, on a high hill commanding the narrow Sangrámpur valley. Founded by Rájá Bel, a Chandela Rájput, it was enlarged by Rájá Dalpat Sá, of Garha-Mandlá, who made it the seat of Government

about 1540. It was the scene of the defeat of Rání Durgavati by Asaf Khán, an officer of Akbar; and the fort sustained a siege of nine months in the days of Aurangzeb. The remains of the outer circumvallation are very extensive. Of the inner fort on a high central hill, only a tower and some ruined reservoirs remain. Two smaller towers also stand on neighbouring hills.

Singhāna.—Town in the Shaikhāwati district of Jaipur State, Rájputāna; situated in lat. $28^{\circ} 5' N.$, and long. $75^{\circ} 44' E.$, 95 miles south-west of Delhi, and 80 north of Jaipur city. Population (1881) 5259, namely, Hindus, 3117; Muhammadans, 2123; and 'others,' 19. Elphinstone describes it as a handsome town built of stone, on the skirts of a hill of purplish rock, about 600 feet high. A copper mine in a rocky hill, 2 miles south-west of the town, contains ore of a poor quality, yielding from 2 to 7 per cent. of metal. There are two ores, a sulphate and a sulphuret. This mine having become less productive than formerly, has been closed since 1872. The miners used to pay to the Rájá a duty on the produce. Post-office.

Singhbhúm (*Sinha-bhúmi*, 'Lion Land').—British District in the Lieutenant-Governorship of Bengal, lying between $21^{\circ} 59'$ and $22^{\circ} 53' N.$ lat., and between $85^{\circ} 2'$ and $86^{\circ} 56' E.$ long. Area, 3753 square miles. Population (1881) 453,775 souls. The District forms the south-eastern portion of the Chutiá Nágpur Division. It is bounded on the north by the Districts of Lohárdagá and Mánbhúm, on the east by Midnapur, on the south by the Tributary States of Orissa, and on the west by Lohárdagá and the Tributary States of Chutiá Nágpur. The boundaries follow for the most part the crests of the hill ranges which wall in the District on every side, but owing to the fact that few of the ranges have distinctive names, it is impossible to define the boundary line more precisely. A portion of the northern boundary, 15 miles in length, is marked by the Subarnarekhá river, which fills a gap between two hill ridges; and a still smaller part of the southern boundary coincides with the same river, which here separates Singhbhúm from the Orissa State of Morbhanj. Farther west, again, the Baitarani river, rising in Keunjhar, forms 8 miles of the boundary between that State and Singhbhúm District. Singhbhúm District is made up of the Government estate of the Kolhán or Ho-desam ('country of the Hos'), the Fiscal Division of Dhalbhúm, and the political estates of Paráhát, Sáraikalá, and Kharsáwán. The administrative head-quarters are at CHAIBASA.

Physical Aspects.—The central portion of Singhbhúm consists of a long undulating tract of country, running east and west, and enclosed by great hill ranges. The depressions which lie between the successive ridges are terraced for rice cultivation on the system followed in the Districts of HAZARIBAGH and LOHARDAGA, and the scenery in this central strip,

extending from the Subarnarekhá river on the east to the Angárbari range to the west of Cháibásá, which is the most fertile part, is like that of Chutiá Nágpur Proper. It is fairly clear from forest, and varies in elevation above sea-level from 400 feet near the Subarnarekhá on the east, to 750 feet around the station of Cháibásá. To the south of this is an elevated plateau embracing 700 square miles of country, where the general level rises to upwards of 1300 feet, and meets the hills of Keunjhar State in Orissa. The west of the District, bordering on Chutiá Nágpur, is a mountainous tract of vast extent, sparsely inhabited by the wildest of Kol tribes, and considered by Colonel Dalton to be the region from which that race first descended into the plains of Singhbhúm.

The extreme south-west corner, bordering on Gángpur State, is a still grander mass of mountains, rising to a height of 3500 feet, and known as 'Saranda of the seven hundred hills.' The population here is very scattered; and the whole of Saranda contains but a few poor hamlets nestling in deep valleys, and belonging for the most part to one of the least reclaimed tribes of Kols. From the Layádá Hill range on the north-west of Singhbhúm, many rocky spurs strike out into the District, of which the more prominent attain an elevation of 2900 feet.

Among other ranges and peaks, the following may be mentioned:—The Chaitanpur range, in the estate of Kharsáwán, reaches an elevation of 2529 feet: The Kápargádi range, a conspicuous ridge, rises abruptly from the plain; its highest peak is 1398 feet above the sea, and from that point the range runs south-east till it culminates in Tuilgárh Hill (2492 feet). Thence the ridge gradually widens out, till it forms the northern limit of the Meghásani range in the Orissa State of Morbhanj. On the south-west of the District, a series of hills without any general name rise to a height of 3500 feet, and entirely occupy the tract referred to above as 'Saranda of the seven hundred hills.' A conspicuous spur of this mass of hills stretches out towards Cháibásá, and culminates in the peak of Angárbari, 2137 feet high.

The Singhbhúm hills present in appearance a broken outline of sharp-backed ridges and conical peaks. For the most part they are covered with thick forest, except on the borders of the central fertile plateau, where many of the lower slopes have been cleared for the purpose of cultivation.

The principal rivers of the District are the SUBARNAREKHIA (chief affluents, the Karkai and Sanjai), which drains the eastern portion of the District bordering on Midnapur; and the KOEL, with its affluents the North and South KARO and the KOINA, which receives the drainage of the western part of the District, and of the mountainous region of Saranda. The beds of all the rivers are rocky, and

barriers to navigation exist in many parts of their courses. The banks are steep and covered with jungle, and no system of river-bank cultivation is known in the District.

There are no canals or lakes in Singhbhúm; and the only form of artificial irrigation is the construction of embanked reservoirs across the upper ends of the natural depressions in which rice is grown. Water is thus stored, and is let out upon the crop by channels cut through or round the embankment.

Minerals.—Iron in a nodular form is obtained in most of the hill ranges. The nodules are small, of a dull red colour, and show a glossy surface if subjected to friction. Ore also occurs in the form of a black earth, which is rich in metal, and is usually found in stratified masses, which have to be dug out and broken in pieces before smelting. The furnaces used are built of mud in a cylindrical form, and are about three feet high. They are charged from the top with alternate layers of ore and charcoal; and, after smelting, the iron is raked out from the bottom of the furnace. The blast is obtained from two cup-shaped bellows, which are worked alternately with the feet. Gold is found in minute quantities in the sands of the rivers in the form of spangles. Copper was formerly obtained from the foot of a range of hills in Dhálbhúm; old workings, ascribed to the Jains, are found, extending over many miles, and the operations appear to have been thoroughly exhaustive. Subsequent attempts made to work the mines by European methods have proved unremunerative. Nodular limestone (*kankar* or *ghútin*) occurs all over the District, but not in sufficient quantities to be useful for road-making. Slate and coloured earths are found to the south-west of Cháibásá. Soapstone occurs in several places, and is manufactured into cups and platters.

Forests, Jungle Products, etc.—About two-thirds of Singhbhúm District are covered with primeval forest, the principal trees being *sál* (*Shorea robusta*), *ásan* (*Terminalia tomentosa*), *gamhár* (*Gmelina arborea*), *kusam* (*Schleichera trijuga*), *tún* (*Cedrela Toona*), *piásál* (*Pterocarpus Marsupium*), *sísu* (*Dalbergia Sissoo*), *kend* (*Diospyros melanoxylon*), and *jámun* (*Eugenia jambolana*). Of these, the *sál* is the most valuable, for the hardness of its timber and the size of the beams which the larger specimens yield. The *piásál* is a handsome wood, but, unless well varnished, gives out a yellow stain when wetted. No teak is met with, and no rattans. Jungle products of various kinds abound; but, owing to the isolated position of the District, they command only a nominal value, and yield no revenue. The chief articles of jungle produce are lac, beeswax, *chob*, or the bark of certain creepers twisted into rope; *bábuí* grass, which is also made into rope; and a variety of leaves and roots, which are used for food.

The forests give shelter to tigers, leopards, bears, bison, and several

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The forests give shelter to tigers, leopards, bears, bison, and several

kinds of deer; and small herds of elephants occasionally wander across the boundary from the Meghāsani Hills in Morbhanj. Wild ducks, pigeons, geese, snipe, partridge, and quail are found in the low-lying lands. The pangolin or scaly ant-eater is one of the curiosities of the District. Snakes of all kinds abound.

History.—The following section of this article is condensed from Colonel Dalton's valuable *Ethnology of Bengal*, the portions used being quoted in full in Hunter's *Statistical Account of Bengal*, vol. xvii. pp. 107–114. The Singhbhum Rājput chiefs have been known to the officers of the British Government since 1803, in which year the Marquis of Wellesley, Governor-General, caused friendly communications to be addressed to the ancestor of the present Rājā of Sāraikalā (whose territory adjoined the Jungle Mahāls, then under the East India Company), regarding the assistance which he promised to render in the prosecution of the war against Rāghujī Bhonsla of Nāgpur. There does not appear to have been any intercourse between British officials and the people of the Kolhān previous to the year 1819. Of the interior of their country, for years after the acquisition of the surrounding Districts, nothing whatever was known. The Hos or Larka Kols would allow no strangers to settle in, or even pass through, the Kolhān; and pilgrims to Jagannāth had to make a circuit of several days' journey to avoid it. In 1819, the Assistant Political Agent was directed to proceed to Parāhāt, to negotiate a settlement with its chief; but he did not succeed in penetrating so far into their country, owing to the fears entertained by the people of the savage character of the aboriginal Kols. The Political Officer writes—'The Rājā and the *samindars* of Singhbhum, who are in attendance on me, have so formidable an opinion of the power and ferocity of these savages, that, notwithstanding the considerable force under my command, they are evidently much alarmed, and have made a formal protest against the dangers of the march.'

In 1820, the Rājā of Parāhāt acknowledged himself a feudatory of the British Government, and agreed to pay a small tribute. At this time, the Rājā and *samindars* of Singhbhum were pressing on the Political Agent, Major Roughsedge, their claims to supremacy in the Kolhān, asserting that the Kols were their subjects in rebellion, and urging on Government to force them to return to their allegiance. The Kols denied that they were subject to the chiefs. Until they quarrelled they regarded them, they said, as friends and allies, not as rulers; and if they had at any time been their subjects, they had achieved their liberty in various hard-fought fields, and were entitled to their independence. The chiefs admitted that for more than fifty years they had been unable to exercise any control over them; and Major Roughsedge refers to three formidable but abortive attempts made (the

last in 1800) to subjugate them. After these attacks on their independence, it appears that the Larkas retaliated on all the bordering States, committing great ravages and depopulating entire villages.

In 1820, Major Roughsedge entered their country with a force of artillery, cavalry, and infantry, with the avowed object of compelling the Kols to submit to the Rájás who claimed their allegiance. He did his best to conciliate them, and was at first in hopes that he had succeeded. He was allowed to advance unmolested into the heart of their territory; but while encamped at Cháibási on the Rero river, near the present station of the same name, an attack was made within sight of the camp by a body of Larkas, who killed one man and wounded several others with their battle-axes. They then moved away towards the hills; but their retreat was cut off by Lieutenant Maitland, who in several encounters dispersed them with great loss. The whole of the northern *firs* or communities entered into engagements to pay tribute to the Rájá of Singhbhum. But in leaving the country, Major Roughsedge had to encounter the still fiercer Kols of the southern *firs*; and after fighting every inch of his way out of Singhbhum, he left them unsubdued. Immediately afterwards, a war broke out between the Larkas who had submitted, and those who had not; and a body of 100 Hindustani Irregulars, sent to the assistance of the former, were driven out by the latter.

In 1821, a large force was employed to reduce the Larkas; and after a month's hostilities, the leaders, encouraged by a proclamation, surrendered, and entered into agreements to pay tribute to the Singhbhum chiefs, to keep the roads open and safe, to give up offenders, and also agreed that 'if they were oppressed by any of the chiefs, they would not resort to arms, but would complain to the officer commanding the troops on the frontier, or to some other competent authority.' After a year or two of peace, however, they again became restive, and gradually extended the circle of their depredations. The assistance rendered by them to the Nágpur Kols in the rebellion of 1831-32 was too gross a defiance of the Government to escape serious notice. Sir Thomas Wilkinson, who was then Agent to the Governor-General for the newly formed Non-Regulation Province of the South-Western Frontier, at once recognised the necessity of a thorough subjugation of the Kols, and equally the impolicy and futility of forcing them to submit to the chiefs. He proposed an occupation of Singhbhum by an adequate force, and suggested that, when the people were thoroughly subdued, they should be placed under the direct management of a British officer, to be stationed at Cháibási in the heart of their country. These views were accepted; a force under Colonel Richards entered Singhbhum in November 1836, and by the end of the February following, all refractory head-men had submitted and entered into engagement.

bear true allegiance to the British Government. From this time until 1857 there was no disturbance, and the District seemed to have settled down into quietness and prosperity. In that year, the Paráhát Rájá, after wavering for a little between loyalty and rebellion, chose the latter, and a considerable section of the Kols supported him. A tedious and difficult campaign ensued, the rebels taking refuge in the mountain fastnesses whenever they were driven from the plains. Eventually, however, they surrendered (in 1859), and the capture of the Rájá put an end to the disturbances.

Since that year the Kols have given no trouble. Under the judicious management of a succession of officers, whose names will always be household words in the Kolhán, these savages have been gradually tamed, softened, and civilised, rather than subjugated. Up to a few years ago, they steadily opposed the opening of roads through their territory, removing from the villages to the hills (their usual custom when dissatisfied and excited) till the obnoxious posts set up to mark the alignment were taken down, and the project abandoned. Now their country is in all directions traversed by good roads, made by themselves under the superintendence of their officers. New sources of industrial wealth have been opened out, new crops requiring more careful cultivation introduced, new wants created and supplied; even a desire for education has been engendered and fostered, and already well-educated Kols are to be found among the clerks of the Cháibásá courts. The ameliorating influences of Christianity have also made themselves felt, in a striking manner, among the Kols. The work has gone on with increasing vigour of late years, and the number of converts is now much larger than the returns of 1881 (quoted below) indicate.

Population.—The first attempt at an enumeration of the people of Singhbhúm was made in 1867, when a Census was undertaken of the Government estate of the Kolhán. From the results of this, an estimate was made for the total population of the District, as then constituted, which amounted, according to the calculations, to 355,906 souls. The regular Census of 1872, on an area corresponding to the present District, returned the population at 318,180. The last enumeration in 1881 disclosed a population of 453,775, showing an apparent increase of 135,595, or 42·61 per cent., in nine years—an increase, however, mainly due to defective enumeration in 1872.

The results of the Census of 1881 may be summarized as follows:—Area of District, 3753 square miles, with 1 town and 3000 villages; number of houses, 86,306, namely, occupied 85,843, and unoccupied 463. Total population, 453,775, namely, males 226,681, and females 227,094. Average density of the population, 121 persons per square mile; villages per square mile, 0·80; persons per village, 151; houses

per square mile, 23; inmates per house, 5.29. Classified according to sex and age, the population consisted of—under 15 years of age, boys 100,404, and girls 95,695; total children, 196,099, or 43.2 per cent. of the population: 15 years and upwards, males 126,277, and females 131,399; total adults, 257,676, or 56.8 per cent.

Religion.—Classified according to religion, the population in 1881 consisted of—Hindus, 447,810, or 98.68 per cent. of the total; Muhammadans, 2329; Christians, 2988; and 'others,' 648, consisting entirely of non-Hindu Santāls.

Among aboriginal tribes, the most numerous are the Kols, of whom there were 187,723 in 1881, all returned as Hindus by religion. The name Kol, as popularly used, includes not only Hos and Mundas, but also the Dravidian Uraons, while its scientific use embraces the cognate Kolarian tribes of Mundas, Hos or Larka Kols, Bhūmijis, and Kharwārs. The two last tribes are returned separately in the Census Report of 1881, the former numbering 40,070, and the latter 3822, thus making a total Kol population of 231,615, or 51 per cent. of that of the whole District. The bulk of the Kols enumerated above are Hos, otherwise called Larka or 'fighting' Kols, the characteristic aboriginal race of Singhbhum.

A detailed account of this tribe, taken from Colonel Dalton's *Ethnology of Bengal*, will be found in *The Statistical Account of Bengal*, vol. xvii. pp. 39-59, and in a more abbreviated form under the article *Kol*, ante, vol. viii. pp. 253-260. The Kols appear to have no traditions of origin or migration that throw much light on their history. As has been said in the preceding section, they isolated themselves jealously for many years, and even at the present day the exclusiveness of the old Hos is remarkable. They will not allow aliens to hold lands near their villages; and, indeed, if it were left to them, no strangers would be permitted to settle in the Kolhān. Physically, the Singhbhum Hos are the finest of all the Kolarian tribes. The men average 5 feet 5 or 6 inches in height; the women 5 feet 2 inches; and both men and women are noticeable for their fine erect carriage and long free stride. They do not encumber themselves with much clothing, and even wealthy men move about all but naked, as proudly as if they were clad in purple and fine linen. The Hos are fair marksmen with the bow and arrow, and great sportsmen. They are a purely agricultural people, and their festivals are all connected with that pursuit. They show great reverence for the dead, and their peculiar and touching funeral ceremonies are well described by Colonel Dalton. The same writer describes the Hos as possessing 'a manner free from servility, but never rude; a love, or at least the practice, of truth; a feeling of self-respect, rendering them keenly sensitive under rebuke;' and he adds that since they have come under our rule, 'they have become less sus-

picious, less revengeful, less bloodthirsty, less contumacious,' than they were. They are still, however, easily excited to rash action.

Of the other aboriginal tribes in Singhbhúm, Santáls number 52,602, of whom all but 648 are returned as Hindus. Bhuiyás number 8141; Gonds, 1628; and 'others,' 10,513. Total aborigines, 304,499, or 67·1 per cent. of the District population. It is singular that, although the Singhbhúm aborigines are the wildest and most backward of all the Districts of the Chutiá Nágpur Division, the whole of the aboriginal population, with the exception of 648 Santáls, should be returned as Hindus by religion.

Among recognised Hindus, the higher castes are numerically very weak. Bráhmans number only 2886; Rájputs, 1949; Káyastis, 993; Khandauts, 391; and Baniyás, 2259. Among the lower or Súdra castes are included the following:—Goálá, the most numerous caste in the District, 38,672; Tánti, 20,839; Kúrmí, 9124; Lohár, 7728; Kumbhár, 6882; Telí, 3394; Dhobí, 2626; Sunri, 2611; Máli, 2342; Nápit, 2321; Dom, 2171; Hari, 1355; Sadgop, 1239; and Bauri, 1055. Caste-rejecting Hindus number 3491, including 2863 Vaishnavs.

The Muhammadans only number 2329, or 0·5 per cent. of the District population. None of the reforming sects of Islám are represented in Singhbhúm; and the existing Musalmán community makes no converts, except among Hindus who have been expelled from their caste. Nearly the whole of the native Christians are converts from the aboriginal races. Three missions are at work in the District—the Society for the Propagation of the Gospel, the Lutheran Evangelical Mission, and a Roman Catholic Mission.

Urban and Rural Population.—The population is entirely rural, and the only place with upwards of five thousand inhabitants is CHAIBASA, which in 1881 contained a population of 6006. Of the 3000 villages, no less than 2276 contained less than two hundred inhabitants; 611 had between two hundred and five hundred; 106 between five hundred and a thousand; and 7 between one thousand and two thousand inhabitants. In the wilder jungles to the south and east of the Kolhán proper, there still exist, in the shape of tanks and architectural remains, traces of a people more civilised than the Kols of the present day. The most interesting of these are—Benu Ságar, a fine tank surrounded by the ruins of what must have been a large town; Kiching, with its temples still resorted to by pilgrims; and two very curious artificial pools of water, called the Surmí and Durmí. The sepulchral and monumental stones which are characteristic of the Mundas and Hos occur in large numbers throughout the District.

The Material Condition of the People.—The wonderful progress in the condition of the people that has taken place of late years may

be vividly illustrated by two quotations from Government Reports. In reporting on Singhbhum District in 1854, Sir Henry Ricketts referred in the following terms to Captain Haughton's proposal that the *pan* or customary price paid for a wife should be abolished, as being a serious check to the increase of population:—'For some reasons it certainly would be good were the custom abolished; but so long as the Kols continue to be what the Kols are now, any plan which has the effect of preventing an increase of their numbers is not without advantage. I cannot consider it desirable that there should be more Kols; though I would omit no endeavour to improve the condition, both moral and physical, of those who unfortunately hold some of the fairest *parganas* of Singhbhum.' In 1873, Captain Garbett described the Kol villages as 'perfect pictures of comfort and prettiness,' adding that 'the brisk attendance and business done at markets, the increasing use of brass instead of earthen utensils, the more common wearing by the women of a better description of *saree*, and a dozen other indications in themselves perhaps slight, but important in the aggregate, all attest the growing progressive prosperity of the people.' This improvement has been accompanied by a marked increase in the numbers of the people. In the hills and backwoods, types of the more primitive Ho may still be found; but in a few more years, if these wild foresters remain in their present condition, they will be altogether repudiated by their refined brethren round Chaibasa. The Hindu inhabitants of Singhbhum, chiefly Mathurabasis, Goalas, and Kurmis, are good cultivators, and some have risen to be substantial farmers. They are particularly enterprising in reclaiming waste land and founding new villages. Certainty of tenure, freedom from agrarian disputes, and low rates of rent all over the District are the chief causes which have effected this change in the material condition of the people, aided by the extension of roads in all directions, the development of fresh sources of industrial wealth—such as the trade in *tasar* silk—the cultivation of new crops, and the gradual spread of education.

Agriculture.—The system of rice cultivation is similar to that described in the article on HAZARIBAGH, though it is not so fully developed here as in that District and LOHARDAGA. Land is classified on the same principle, and the crops are the same; but, except in villages occupied by the Hindu caste of Kurmis, the general style of cultivation is primitive, and the land undergoes scarcely any systematic preparation for the crop. Of late years, however, the Kols have made a considerable advance in the methods of tillage, and now get three crops in the year when formerly they had but one. The chief crops of the District, besides rice, are wheat, Indian corn, peas, gram, mustard, sugar-cane, cotton, and tobacco. The area under different crops has been estimated as follows:—Rice, 503,233 acres; cotton, 23,637 acres; Indian corn,

63,029 acres; oil-seeds, 40,665 acres; wheat, 1271 acres; pulses, 3813 acres. As, however, great uncertainty attaches to all the agricultural statistics of the Chutiá Nágpur Division, these figures must be looked upon as approximate only. Wages in Singhbhúm have not risen of late years in proportion to the increase in the price of ordinary food staples. Labour is abundant, and families are, as usual in the case of a considerable aboriginal population, large. Unskilled labourers (male) receive from 2½d. to 3d. a day, and females 1½d. The rate for women is the same as it was in former times, but men used to receive only 1½d. Bricklayers and carpenters now earn 6d. per diem; formerly their wages were 3½d. The average price of the best cleaned rice is about 2s. 9d. per cwt., and of coarse rice 2s. 3½d. The price of the best unhusked rice is about 1s. 1d., and of Indian corn 1s. 8½d. per cwt. These prices represent a rise of from 25 to 50 per cent. on the rates which ruled twenty years ago.

The prevailing land tenures vary in different parts of the District. In the Kolhán there is now only one kind of tenure,—under which rent is paid direct to Government by each individual cultivator, whose right of occupation is hereditary, but liable to enhancement of rent at the expiration of the current settlement. Dhalbhúm bears a fixed assessment of £426, 14s. It was originally one of the *Jungle Maháls*, and was transferred to Singhbhúm from Mánbhúm in 1846. The proprietor of the *parganá* calls himself Rájá, but he is officially styled *zamíndár*. The Kolhán pays an assessment of £4606 a year; the Paráhát estate, £1760; and Baudgáon, £67. Among the intermediate tenures between the *zamíndár* and the cultivators may be mentioned—*khoroposh* or maintenance grants (74 in number) to younger members of the *zamíndár's* family; *ghátwáli* tenures for some kinds of police service, the precise nature of which cannot now be ascertained; and *sad chakrán* holdings (51), service tenures entirely dependent on the pleasure of the *zamíndár*. The other prevalent intermediate tenures are—*Brahmottar*, 93; *debottar*, 85; and *pradháni* or farming leases for (839) limited or (74) unlimited periods. The actual cultivating tenures in Dhalbhúm are known by the generic term *prajáli* (from *prajá*, a peasant), and are of two kinds, *khunt katti* and *thiká*. The *khunt katti* cultivators are supposed to be descendants of the persons who originally reclaimed the land from jungle, and formed the village; all of them have permanent rights of occupancy, and some have the further privilege of holding at a fixed rate of rent. Cultivators holding under the *thiká* tenure are persons who came into the village after the first reclaimers. Their holdings are not transferable, and they have no share in the common rights of the village. *Chakrán* or service holdings are very numerous, and the chiefs consequently derive a proportionally small income from their large estates.

Natural Calamities.—The District is subject to partial scarcities, caused by deficiency in the local rainfall. In years of drought, the cultivators resort to artificial reservoirs, wells, and tanks for water to irrigate their fields. The famine of 1866 was felt throughout the District, but only severely in Dhalbhum, where the chief food of the people is rice. The highest price reached for ordinary rice in Singhbhum in that year (in August) was £1, 2s. a cwt. The District mainly depends on the winter rice; and if the yield of that crop were to be less than one-half, and if the price of ordinary rice were to rise as high as from 7s. to 9s. a cwt., these symptoms should be considered as a warning of approaching famine.

Commerce and Trade, &c.—The trade of Singhbhum is carried on mainly by means of permanent markets, the chief of which are held at Cháibasá, Kharsáwán, Sáraikalá, and Baháragarhá. The principal exports are grain, pulses, oil-seeds, stick-lac, iron, and *tasar*-silk cocoons; the chief imports—salt, cotton yarn, English piece-goods, tobacco, and brass utensils. The value of the silk export was estimated in 1871 to amount to £10,000; and it is said that the total value of the exports largely exceeds that of the imports. The chief manufactures of Singhbhum are coarse cotton cloth, brass and earthenware cooking utensils, and soapstone platters. There are a few weavers of *tasar*-silk cloth in Sáraikalá. Copper is found in Sáraikalá and Dhalbhum, and an English Company was started in 1857 to work the mine. The enterprise was conducted on too expensive a scale, and failed in 1859; a second Company, formed in 1862, was not more fortunate, and was dissolved in 1864, without having even paid rent for the two years over which its operations extended. The total length of roads in Singhbhum in 1883 was 536 miles.

Administration.—In 1837, the revenue of the District, which was then smaller in area than at present, amounted to £527, almost entirely derived from land; and the current expenditure to £1011, or nearly double the revenue. In 1846, the *paigáná* of Dhalbhum, assessed in perpetuity at £426, was added to the District; and in 1850–51, the total revenue was returned at £1219, and the civil expenditure at £1928. Thus within a period of thirteen years, between 1837 and 1850–51, the revenue more than doubled, owing mainly to the extension of cultivation in the Kolhán, and the amount accruing from Dhalbhum. It failed, however, to cover the expenditure on civil administration, which had increased by 58 per cent. within the same period. In 1870–71, the net revenue had risen to £9500, and the total expenditure to £10,163. In 1883–84, the revenue was £10,084, and the cost of civil administration £6096. The land-tax forms by far the largest item in the revenue of the District. In 1837 it amounted to £523, derived solely from the

Kolhán. In 1846, the land revenue was £1133; and the *samíndár* of Dhalbhúm was the only registered proprietor, and Dhalbhúm and the Kolhán were the only two estates on the District rent-roll. In 1883-84, the land revenue was £6096, the number of estates being four, namely, the Kolhán, Dhalbhúm, Paráhát, and Baudgaon.

In 1883, the regular police force numbered 161 men of all ranks, maintained at a total cost of £3277. There was also a rural police or village watch of 546 men, maintained by contributions from the villagers, and costing £956. The total machinery, therefore, for the protection of person and property in the District consisted of 607 officers and men, showing (according to the Census returns of area and population) 1 man to every 6·2 square miles of the area and to every 747 of the population. The estimated total cost was £4233, giving an average of £1, 2s. 6½d. per square mile of area and 2½d. per head of the population. Suicide is a characteristic crime of the District, chiefly among the Kols, who are an extremely sensitive race. The average daily number of prisoners in the Chaíbásá jail in 1883 was 63.

The progress of education in Singhbhúm has, owing to its secluded position, been very slow, but of late years there has been a great improvement. The number of Government and aided schools in 1870-71 was 9, with 684 pupils. By 1882-83 the number of schools had increased to 170, and the pupils to about 8500. The Census Report of 1881 returned 4540 boys and 107 girls as under instruction, besides 4655 males and 132 females able to read and write but not under instruction.

There are no administrative Sub-divisions in Singhbhúm, nor are there any *parganás* properly so called. The real internal divisional units of the District are the estates already referred to. The *pír*, or group of villages, is the administrative unit of the old village organization of the Hos and Mundas; but the fiscal character which it bears in the Kolhán is solely of British institution, and does not form part of the indigenous system. It is both smaller and more symmetrical than the *parganá* of the Regulation Districts.

Medical Aspects.—The climate of Singhbhúm is, as might be supposed from its inland position, dry. The civil station of Chaíbásá is healthy, but the jungle-clad hill tracts are so malarious that they cannot be visited with safety before the month of November. December and January are the coldest months, and at this season the thermometer sometimes falls as low as 50° F. The weather in the hot season is extremely trying, the thermometer frequently marking 106° F. in the shade. The average annual rainfall is returned at 57 inches. The prevailing endemic diseases are intermittent and remittent fevers of the ordinary type. Epidemics of small-pox and cholera have occasionally occurred; the severest recent outbreak of cholera was that which immediately followed the famine of 1866. There is a charitable

dispensary at Cháibáá. [For further information regarding Singhbhúm, see *The Statistical Account of Bengal*, by W. W. Hunter, vol. xvii. pp. 1-146 (London, Trubner & Co., 1877); also Mr. (the late Sir Henry) Rickett's *Report on Singhbhúm District* (1854); the *Bengal Census Report* for 1881; and the several annual Administration and Departmental Reports of the Bengal Government.]

Singheswarthán.—Village in Bhálgapur District, Bengal; situated in lat. $25^{\circ} 58' 48''$ N., and long. $86^{\circ} 50' 31''$ E., 4 miles north of Madahpurá. Well known in Behar for being the scene of the largest elephant fair north of the Ganges; this is held in January, and attended by traders from Purniah, Monghyr, Tirhut, and the neighbouring parts of Nepál. Native shoes, English cloth, horses, long Nepálese knives or *kukris* form the other principal articles of commerce. Temple belonging to the Pándes.

Singhpur.—Town in Narsinghpur *tahsil*, Narsinghpur District, Central Provinces. Population (1881) 3130, namely, Hindus, 2612; Muhammadans, 343, Kabirpanthis, 40; and non-Hindu aboriginal tribes, 135.

Singhpur (or *Sorvasthán Singhpur*).—Petty State in the Meháras tract of Khándesh District, Bombay. Population (1881) 646. A small tract of plain country covered by thick forest, which, besides timber, yields *mahuá* flowers, wax, and honey. The soil is good, but, except near villages, is little cultivated. The chief is a Bhíl.

Singimári.—Village in the south-west of Goalpárá District, Assam, near the left bank of the Brahmaputra; about 42 miles west of Turá station in the Gáro Hills, with which it is connected by road. An important weekly market is held in the village, which is largely resorted to by the Gáros.

Singimári.—Principal river of Kuch Behar State, Bengal. Entering the State under the name of the Jaldhaká, at its extreme north-west corner, near Moranger-hát in Khitu, it flows in a south-eastern direction by the villages of Gildángá, Pángurám, Dháibhángá, Khaterbárá, and Mátábhángá. In the middle of its course it is called the Manábhá, and lower down, the Singimári. It has several cross communications with the Dharlá or Torshá, and finally joins that river on the southern border of the State, near the trading villages of Durgápur and Gáldaha. It has several large tributaries, among which may be mentioned the Mujná, Satangá, Duduyá, Dolang, and Dákhá. The capital of Kuch Behar was formerly situated on the banks of the Singimári near Gosáinimarái (at Kamatapur), where the ruins of temples and fortresses still attest the bygone greatness of former days. The river is navigable all the year round by boats of 100 maunds burden as far as the Sub-divisional station of Mátábhángá, and even a little beyond and in the rainy season is largely used for navigation.

Singlá.—River in the extreme south-east of Sylhet District, Assam, flowing north from the Lusháí Hills into the Kusiára branch of the Surmá river. It has given its name to an elephant *mahál* or hunting-ground, and also to a forest reserve.

Singpho Hills.—Tract of country bordering the extreme eastern frontier of Assam, occupied by the Singphos, a wild tribe who are said to be an offshoot of the Ka-khyens of Burma. In their own language, the word 'Singpho' means man. In ethnical characteristics, language, and religion, the Singphos differ markedly from the Khamtís and other neighbouring races of Shan origin. They are said to have first settled in their present home towards the close of the 18th century, when the power of the Ahom kings was falling into decay. Their permanent villages were placed on the Tengipání river east of Sadiyá, and on the Buri Dihing river in the tract called Námrúp. They took advantage of the disturbed state of Upper Assam, caused by the rebellion of the Moámariás, to ravage the whole valley of the Brahmaputra, and carry off numbers of the Assamese into slavery. At the present time, there is a mongrel race well known in Upper Assam under the name of Doanniyás, sprung from the intercourse between the Singphos and their female slaves. When the British took possession of the Province, these raids were suppressed. Captain Neufville, the commandant at Sadiyá, is said to have released 5000 Assamese captives after a single expedition. The Singphos have now entirely abandoned their old habits of lawlessness. They live by agriculture, and have considerable skill in the smelting of iron and in the weaving of cotton into coloured plaid checks. According to the Census Report of 1872, they only numbered 257 souls in the settled portion of Lakhimpur District. In 1881, the Census returned the Singphos at 1774, still confined to Lakhimpur District.

Singrauli.—Tract of land in Mirzápur District, North-Western Provinces, consisting of a depressed alluvial basin, below the level of the surrounding country, and composed in parts of a rich black loam, merging at other places into a hard and unproductive clay.

Singraur.—Village in Soráon *tahsil*, Allahábád District, North-Western Provinces; situated in lat. 25° 35' 3" N., and long. 81° 41' 10" E., 18 miles north-west of Allahábád city. Population (1881) 1723. Singraur is said to have been a large place in former days, but the Ganges first undermined its southern face, and swept away a large portion of the town, leaving a precipitous cliff some 90 feet in height. Since then the river has deserted the town, and only a small branch now passes under Singraur, in the wide channel where the whole stream of the Ganges once passed along. Singraur was the scene of the last act in the rebellion of Khán Zamán and his brother Bahádur against Akbar. A ruined mound known as the Surya Bhita, a mile north of

In 1665, a Mughal force blockaded Sinhgarrh, and Sivají submitted. In 1670, it was retaken by Tánájí Málusra; this capture forms one of the most daring exploits in Maráthá history. Between 1701 and 1703, Aurangzeb besieged Sinhgarrh. After three and a half months' siege the fort was bought from the commandant, and its name changed to Bakshindábaksh, or 'God's gift.' In 1706, as soon as the Mughal troops marched from Poona to Bijápur, Shankrají Náráyan Sachiv, chief manager of the country round, retook Sinhgarrh and other forts. Sinhgarrh remained with the Maráthás till the war of 1818, when it was carried by storm by General Pritzer.

Sinjhauli Sháhzádpur.—Town in Faizábád (Fyzábád) District, Oudh, situated in lat. $26^{\circ} 24' N.$, and long. $82^{\circ} 35' E.$, on a picturesque spot on the high bank of the Tons, opposite Akbarpur, 36 miles from Faizábád town, on the road to Jaunpur. Founded by Sujhawal, a Bhar chief, and called after him Sujhawalgarh, which has since been altered to Sinjhauli. A certain Sayyid Táj settled here, and dug a tank; a tomb on an island within this tank bears an inscription dated 1365 A.D., one of the oldest in Oudh. A family of Rájput bankers formerly flourished here. Population (1881) 4522, of whom 1252 were Sunnis, 88 Shiás, and 3182 Hindus. Four mosques; 4 Hindu temples; 916 houses, of which 24 are of masonry.

Sinnar.—Sub-division of Násik District, Bombay Presidency. Area, 519 square miles. Population (1881) 66,081, namely, males 33,359, and females 32,722, occupying 10,189 houses in 1 town and 98 villages. Hindus number 61,394; Muhammadans, 1978, and 'others,' 2709. Sinnar, the southmost Sub-division of Násik, is a rather bare table-land, bounded on the south by a high range of hills which run into Ahmadnagar District. The Sub-division contains soil of almost every variety. The water-supply, especially in the east and in the hilly parts to the south, is scanty. The climate is healthy. In 1880-81, 6277 holdings or *khálds* were recorded, with an average area of 37 acres and an average assessment of £2, 16s. In the same year, 187,797 acres were under actual cultivation, of which 2473 acres were twice cropped. Cereals and millets occupied 164,090 acres, pulses, 14,179 acres; oil-seeds, 8088 acres; fibres, 225 acres, and miscellaneous crops, 3688 acres. In 1883 the Sub-division contained 1 civil and 2 criminal courts; police circle (*thánd*), 1; regular police, 45 men; village watch (*chaulídárs*), 124. Land revenue, £15,073.

Sinnar.—Town and municipality in Násik District, Bombay Presidency, and head-quarters of Sinnar Sub-division, situated in lat. $19^{\circ} 50' 25'' N.$, and long. $74^{\circ} 2' 30'' E.$, on the Násik and Poona road, 17 miles south-east of the former town. It is a municipal town, with a population (1881) of 7960 persons, almost entirely engaged in agriculture. Hindus number 7288; Muhammadans, 525; Jains, 75; Christians, 11;

stream of the Brahmaputra, in lat. $24^{\circ} 26' 58''$ N., and long. $89^{\circ} 47' 5''$ E. Population (1872) 18,873; (1881) 21,037, namely, males 11,213, and females 9824. Muhammadans number 12,285; Hindus, 8574; and 'others,' 178. Municipal income (1876-77), £573; (1883-84), £1265, of which £921 was derived from taxation; average incidence of taxation, 10 $\frac{3}{4}$ d. per head. The town consists of 12 streets, and is traversed by the Pábná and Chándáikóná roads; it contains only 1 market; there are 4 *gháts* or landing-places, viz. Ferry *ghát* on the Dhánbandi river (which flows through Sirájanj), Kálibári, Rahua-bári, and the Jute Company's *ghát* in Máchampur.

The following description of Sirájanj and its river trade is condensed from the *Report on the River Trade of Bengal for 1876-77*, the facts having been originally supplied by Mr. Nolan, who was for several years Magistrate of the Sirájanj Sub-division:—

The town is said to take its name from a local *zamindár*, called Siráj All, who first opened a *bázár* here in the beginning of the present century. It then stood upon the bank of the Jamuná; but in 1848 an excessive flood of the river washed the entire town away. The traders thereupon retreated some 5 miles backward to the new bank; and when the river, in a fresh caprice, returned to its old channel, they determined to remain where they were, safe from inundation, though at a long distance from their daily place of business. During the rainy season, from June to October, the Jamuná comes down in flood, overflowing the waste of sand between the houses and the *bázár*, and filling the branch stream that passes through the town. For the rest of the year, business is entirely conducted on the permanent bank of the Jamuná, wherever that may happen to be, for the mighty river sweeps away acres of land and alters its navigable channel every year. Hence it is that Sirájanj has been described from the deck of a Brahmaputra steamer as 'a town without houses.' Scarcely a warehouse stands on the river's brink, nor a tree to afford shelter. Large boats and flats lie anchored in mid-stream, fleets of smaller craft take shelter in the natural bends of the river; while the merchants and brokers move to and fro in light *dinghies*, to conduct their transactions on the spot. The bright head-dresses of the Márwáris afford a lively contrast to the white robes of the Bengálís and the riding costumes and pith hats of the Europeans. On the shore, crowds of coolies are busy landing the open 'hanks' of jute, packing them into 'drums,' and again reshipping them for Calcutta. All this is done under the blaze of a tropical sun; and all those engaged have to traverse twice daily the blinding waste of 5 miles of sand that intervenes between their houses and the river.

In 1877 there were six European firms, or branches of firms, established at Sirájanj; and also an agency of the Bank of Bengal,

imports specie every year to the amount of about £500,000, to liquidate the favourable balance of exchange. The principal native merchants are Márwáris, locally known as Káyas, who are immigrants from Rájputána, and mostly profess the Jain religion. Their head-quarters in Bengal are in Murshidábád District, but their operations extend as far as the eastern corner of Assam. Like their brethren in the Deccan, they are a clannish race, who undertake considerable speculations in reliance upon the good faith of their numerous and distant correspondents. They are described as honest, frugal, and diligent, but quite uneducated. The Bengali traders chiefly belong to the caste of Sháhás. They are very intelligent, but lack enterprise and confidence in one another.

The business of Sirájganj is mainly that of a changing station. The agricultural produce of all the country round is brought in in small boats, either by the cultivators themselves or by petty dealers, and here transferred to the wholesale merchants, for shipment to Calcutta in steamers or large cargo boats. In return, piece-goods, salt, hardware, and all sorts of miscellaneous articles are received from Calcutta for distribution. In 1876-77, the aggregate value of the registered trade of Sirájganj, including both exports and imports, amounted to more than $3\frac{1}{2}$ millions sterling; but in this total a great deal is counted twice over. The following are the principal items, in one table or the other:—Jute, £606,000; European piece-goods, £264,000; salt, £263,000; oil-seeds, £171,000; oil, £97,000; rice and other grain, £83,000; sugar, £83,000; tobacco, £74,000; gunny-bags, £69,000. The larger half of this trade is conducted direct with Calcutta, to which the exports in 1876-77 were valued at £831,000. Next in importance comes the trade of the surrounding country, and then the supply of rice and general stores to the coolies on the Assam tea-gardens. The relative amount of business done with the neighbouring Districts is shown by the following figures:—Imports from Rangpur, 830,000 *maunds* of jute, 62,000 *maunds* of tobacco, and 28,000 *maunds* of oil-seeds; exports to Rangpur, 167,000 *maunds* of salt and £18,000 of piece-goods; imports from Maimansingh, 294,000 *maunds* of jute and 140,000 *maunds* of mustard seed; exports to Maimansingh, 71,000 *maunds* of salt and £43,000 of piece-goods; imports from Kuch Behar, 160,000 *maunds* of jute and 28,000 *maunds* of tobacco; exports to Kuch Behar, 35,000 *maunds* of salt; imports from Jaljiguri, 44,000 *maunds* of jute and 40,000 *maunds* of tobacco; imports from Bogra, 209,000 *maunds* of jute; imports from Godpárá in Assam, 98,000 *maunds* of jute and 166,000 *maunds* of mustard seed. Owing to the discontinuance of the registration of the total traffic of Sirájganj in the beginning of 1878, later figures than those given above are not available. Certain statistics with

the rainy season; but besides supplying the local demand, it annually exports large numbers of gunny-bags to Calcutta. They are carried by rail at favourable rates, though the coal always comes up by boat. In 1876-77, the export of gunny-bags was 3,161,500 in number, valued at £69,550. In 1877-78 the number was 2,950,625; while by 1885-86 it had increased to 6,061,240. In 1876-77, the import of coal for the use of the mill was 112,600 *maunds*, valued at £5630. In 1885-86, coal was imported to Sirájanj to the extent of 153,393 *maunds*.

The other principal articles of trade with Calcutta in 1885-86 were returned as follows:—Exports from Sirájanj: husked rice, 38,639 *maunds*; other food-grains, 13,633 *maunds*; oil-seeds, 365,837 *maunds*; drugs, 32,430 *maunds*; and tobacco, 29,250 *maunds*. Imports from Calcutta: piece-goods, value £273,427; salt, 469,787 *maunds*; and metals, chiefly manufactured, 16,069 *maunds*.

The municipal committee have twice taken a boat census of Sirájanj. On 31st August 1873, the number of boats found was 1436, laden with 162,000 *maunds* of goods, of which nearly three-fifths was jute. On 4th September 1874, 1185 boats were counted, with cargoes aggregating 195,000 *maunds*. Sirájanj was also a registration station, at which 49,644 boats were counted in the year 1876-77, passing up or down stream. The registration of traffic was abolished in the beginning of 1878, and later statistics than those given above, except as regards the trade with Calcutta, are not available.

Sirakot.—Ruined fort and temple in Kumáun District, North-Western Provinces; situated in 29° 49' N. lat., and 80° 17' E. long., 9 miles north-west of the confluence of the Gori and Eastern Káli rivers. Elevation above sea-level, 6924 feet. Crowns a rocky ridge, with two of its sides scarped to a sheer depth of 2000 feet, and having its front terminated by a chasm 700 feet in depth. The narrow path from Almora to Nepál winds round one of its flanks. The temple stands upon a conical rock, rising nearly perpendicularly from the ridge covered by the crumbling fortifications. During the Gúrkha invasion in the early part of the century, the garrison was cut off from their water-supply, upon which they surrendered, and the fort has ever since remained in a ruinous condition.

Sirálí.—Village in Makrai Native State, Hoshangábád District, Central Provinces. Population (1881) 2025, namely, Hindus, 1753; Muhammadans, 271; and 'others,' 1.

Siralkoppa.—Town and municipality in Shimoga District, Mysore State. Lat. 14° 20' 50" N., long. 75° 19' 53" E. Population (1881) 1954. Important mercantile centre, where the jaggery prepared from sugar-cane in the surrounding country is collected for despatch to the neighbouring Districts of Bombay and Madras. Piece-goods and

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81° 22' E., 38 miles west-north-west of Allahābād city. Population (1881) 1711. Besides the usual Sub-divisional courts and offices, the town contains a post office and police station. It is also a station on the East Indian Railway.

Sirdhāna.—Town in Meerut (Merath) District, North-Western Provinces.—*See* SARDHANA.

Sirgūjā.—Native State in Chutia Nāgpur, Bengal.—*See* SARGUJA.

Sirhind (*Sirhind*).—Tract in the Lieutenant-Governorship of the Punjab; consisting of the north-eastern portion of the plain which intervenes between the Jumna and the Sutlej rivers. It includes the British Districts of AMBALA (Umballa), LUDHIANA, and FIROZPUR, together with the Native States of PATIALA, JIND, and NABHA, each of which see separately. Sirhind has now no existence as an administrative division of territory; but in the historical sense, it includes all that portion of the cis-Sutlej tract which lies between the Simla Hills on the north-east, the Jumna Valley Districts (Karnāl and Rohtak) on the east, Harāna (Sirsa and Hissār) on the south, and the Sutlej on the north-west; or more roughly speaking, it embraces the level plain between the Himalayas and the desert of Bikaner, the Sutlej and the Jumna. This tract comprises the whole watershed of the now deserted stream which once formed the great SARASWATI (Sarsuti) river; and the newly opened Sirhind Canal will doubtless once more spread fertility over its somewhat desolate expanse. (For further particulars, see CIS-SUTLEJ STATES.)

Sirhind Canal.—An important irrigation work, in Amballa (Umballa) and Ludhiāna Districts, and Patiala, Nābha, and Jind States, Punjab. The canal draws its supply from the Sutlej near Rupar, and runs through Ludhiāna and Ferozpur Districts. Other branches traverse Patiala, Nābha, and Jind, terminating in Sirsa and Karnāl Districts. Water was admitted into the main canal in July 1882, but the branch system has not yet (1885) been completed, although the works are being pushed forward with great energy. Up to the close of the official year 1883–84, the total Government expenditure on capital account was £5,033,284. This is exclusive of a large sum contributed by the Native States which will be benefited by the canal.

• **Sirmur** (*Sirmur*).—One of the sub-Himalayan or Hill States under the Government of the Punjab, frequently called NAHAN, from the name of the chief town. Sirmur is bounded on the north by the Hill States of Balsan and Jabbal; on the east by the British District of the Dehra Dūn, from which it is separated by the rivers Tons and Jumna; on the south west by Amballa (Umballa) District, and some detached portions of the Native State of Kalsia; and on the north-west by the Native States of Patiala and Keunthal. It lies between lat. 30° 24'

and 31° N., and between long. $77^{\circ} 5'$ and $77^{\circ} 50'$ E. Area, 1077 square miles. Population (1881) 112,371 souls.

Physical Aspects.—Except a very small tract about Náhan, on the south-western extremity, where a few streams rise and flow south-westward to the Saraswati (Sarsuti) and Ghaggar rivers, the whole of Sirmur lies in the basin of the Jumna, which receives from this quarter the Giri and its feeders, the Jalál and the Palúr. The river Tons, the great western arm of the stream called lower down the Jumna, flows along the eastern boundary of Sirmur, and on its right bank receives from it two small streams, the Minus and the Nairai. The surface of the State generally declines in elevation from north to south; the height of the trigonometrical station on the Chor Mountain on the northern frontier being 11,982 feet, and that of the confluence of the Giri and Jumna on the southern frontier about 1500 feet above sea-level. From that confluence, the valley of the Khiárda Dún stretches westward, forming the southern part of Sirmur, and extending about 25 miles in length from east to west, and from 13 to 6 in breadth, terminating to the west at the eastern base of the Náhan ridge. Its surface rises gradually to the westward from the Jumna to the Ghatusan Pass, a distance of 14 miles. From Ghatusan, having an elevation of 2500 feet above the sea, the country falls both eastward, as already stated, and westward, the streams in the former direction flowing to the Jumna, and those in the latter to the Markanda and other rivers holding their course to the Saraswati and Ghaggar. The Khiárda Dún is bounded on the south by the Siwálík range. These hills are of recent formation, and abound in fossil remains of large vertebrate animals. On the north, the Dún is bounded by the Sub-Himálayas. The Rájá Ban, or royal forest, situated in the north-eastern angle of the Dún, yields valuable *sal* timber. Elephants are occasionally trapped in pits. The pasturage of the Dún is exceedingly rich.

The Sain ridge rises to the north-west of the range bounding the Khiárda Dún; on the north, it stretches along the right bank of the river Giri, and has a massive contour, rising at its south-eastern extremity into the summit of Thandu Bhawáni (5700 feet); at its north-western, into that of Sarsu Debi (6299 feet). The formation is limestone, which extends generally to the bed of the Giri, where slate-rock commences. Beyond the Giri, and at the northern extremity of Sirmur, is the remarkable peak of Chor, connected by a transverse ridge with the outer Himálayas, and itself a central point from which subordinate ranges ramify in every direction. The summit is composed of tabular masses of granite, which, though compact, are readily decomposed by the weather.

Sirmur, though its rocks consist of formations usually metalliferous, at present yields little mineral wealth. At Kalsi, a copper-mine was formerly worked, but has now been abandoned. A lead-mine has

also been opened. Iron-ore is abundant, and the Rájá established a foundry some years ago, and has made every endeavour to develop the natural resources of the State. Owing, however, to the difficulties of carriage from the mines, the enterprise has not hitherto proved a financial success. The extensive slate strata are in some places quarried to supply roofing. There is also a mine of mica.

So dense are the forests that the sportsman finds difficulty in making his way through them in search of wild elephants, tigers, leopards, bears, and hyænas, with which they abound. Wild pea-fowl are in many places very numerous, being unmolested in consequence of the superstitious regard of the natives.

History.—Sirmur, which means 'a crowned head,' was the place of residence of the Rájás who ruled over the State before the present dynasty entered the country. It is said that the last Rájá of the ancient line was swept away by a flood; and that Agar Sain Ráwal, of the ruling family of Jaisalmer, from whom the present chief is descended, being at that time in the neighbourhood on a pilgrimage to the Ganges, took possession of the vacant throne. This occurred in 1095 A.D. The descendants of Agar Sain Ráwal have retained the chiefship ever since. In 1803 the country was brought into subjection by the Gúrkhas, who in turn were expelled in 1815 by the British under Sir David Ochterlony. The Rájput Rájá was reinstated in his ancient possessions, with the exception of the fort and *parganá* of Kutáha or Gurhi, given to the Musalmán *sardár* of that place for good service against the enemy; the Khiárda Dún, which was subsequently, in 1833, restored; a tract of hill country to the north of the river Giri made over to the Rájá of Keunthál; and the *parganá*s of Jaunsar and Bawar in the Dehra Dún, annexed to the British dominions.

The present Rájá, Shamsher Prakásh, K.C.S.I., was born about 1843. He receives a salute of 11 guns, and maintains a small force of 55 cavalry, 300 infantry, with 10 field guns, and 20 artillerymen. The police force numbers 125 men. The relations of the chief with the British Government are defined in a *sanad*, dated 21st September 1815, under which he is required to consult the Superintendent of the Hill States in all matters connected with the management of the State, and to furnish a contingent to the British forces when called on. Sentences of death require the confirmation of the Superintendent and the Commissioner of Ambála (Umballa), but all other punishments are awarded by the Rájá on his own authority. The Rájá, who pays no tribute, enjoys an estimated revenue of £21,000.

Population, &c.—No Census had ever been taken of the Punjab States prior to 1881, but in that year a regular enumeration of the people was conducted, on the same lines as in the British Districts. The following is a summary of the results as regards Sirmur State:

Area, 1077 square miles, number of villages 2068, and town 1, houses, 26,872, of which 21,562 were occupied and 5310 unoccupied. Number of families, 23,181. Total population, 112,371, namely, males 63,305, and females 49,066; average density of population, 104 persons per square mile. Hindus numbered 107,634, or 95·8 per cent., Muhammadans, 4240, or 3·7 per cent.; Sikhs, 468, Christians, 21, and Jains, 8.

The principal products are opium and several kinds of grain. Ginger is largely cultivated, and the State is famous for its fine breed of sheep. The houses are generally three storeys high; built of stone, boarded with timber, of which there is great abundance, as fine forests of fir, oak, rhododendron, horse-chestnut, and other trees overspread the mountains. The roofs are generally of slate, but sometimes of shingle. The family inhabits the upper storey, which is surrounded by an enclosed balcony projecting 6 or 8 feet beyond the wall. The villages, usually situated on the slopes or tops of hills, have a picturesque effect in the landscape. The natives of Sirmur are of the Aryan type, and obviously of a race allied to the Hindus of the plains; towards the north-east, there is an admixture of the Mongolian stock. Goitre is very prevalent amongst all classes. The dress of the middle classes consists of a simple tunic or frock reaching down to the knees, trousers, and a scarf usually worn across the shoulders, but when the sun is hot, thrown over the head; the lower orders content themselves with a blanket girt round the waist; the higher ranks dress after the fashion of Hindustán, and wear the Sikh turban. The religion prevailing in Sirmur is mainly Hinduism; to which is added the superstitious adoration and dread of innumerable local divinities, with which the imagination of the people has peopled every hill, and valley, and grove. The lives of kine are sacred. The people are divided into castes as in the plains, and Bráhmans abound. The most important tribe in the hills is named Kanet, the members of which number 37,817, or 33·6 per cent. of the total population of the State. Kanets are Hindus, and probably of true Aryan descent. They are popularly supposed to be degenerate Rájputs, who have fallen from their high estate in consequence of the custom which prevails amongst them of purchasing their wives and allowing the marriage of widows. The language is a dialect of Hindi.

Medical Aspects.—The climate of Sirmur varies with the elevation—from that of the Chor, where the surface of the ground is under snow for the greater part of the year, to the stifling malaria of the low-lying Khiárda Dún. In shape, the Khiárda Dún resembles a deep narrow trench shut in by high walls on every side, except towards the east, where it opens to the Jumna; it has a deep alluvial swampy soil, teeming with rank vegetation; and its climate consequently is peculiarly

also been opened. Iron-ore is abundant, and the Rájá established a foundry some years ago, and has made every endeavour to develop the natural resources of the State. Owing, however, to the difficulties of carriage from the mines, the enterprise has not hitherto proved a financial success. The extensive slate strata are in some places quarried to supply roofing. There is also a mine of mica.

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hot and oppressive for about two months after the rains have ceased, and the air is charged with noxious vapours. The greater part of the Dún is mere desert or jungle, untrodden by man, except by a few woodcutters, or by the collectors of gum catechu, which is yielded in great abundance by the *Mimosa*. Cultivation is, however, steadily spreading; and with the clearance of the jungle, the climate will approximate to that of the neighbouring Dehra Dún.

END OF VOLUME XII.

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P
it a rule for same?

hot and oppressive for about two months after the rains have ceased, and the air is charged with noxious vapours. The greater part of the Dún is mere desert or jungle, untrodden by man, except by a few woodcutters, or by the collectors of gum catechu, which is yielded in great abundance by the *Mimosa*. Cultivation is, however, steadily spreading; and with the clearance of the jungle, the climate will approximate to that of the neighbouring Dehra Dún.

END OF VOLUME XII.

manhole be required in barrels over a certain diameter?
his diameter should be?
or a sight-hole should be required for barrels below that

Nominal Horse Power.

1. H. P. of boilers be retained in the certificate?
1 suggest should take its place?
a boiler be rated for inspection fees—on the fire grate
P
ace, what rule would you employ for its measurement?

Tube Plates.

notive type boilers and certain multitubular vertical
or stay tubes in the body of the plate. Should stay
rule for all tube plates or would you agree to accept tube
without stays?
u consider a suitable maximum diameter of barrel beyond
quired?
be taken of the holding power of ordinary tubes expanded
P
it a rule for same?

hot and oppressive for about two months after the rains have ceased, and the air is charged with noxious vapours. The greater part of the Dún is mere desert or jungle, untrodden by man, except by a few wood-cutters, or by the collectors of gum catechu, which is yielded in great abundance by the *Mimosa*. Cultivation is, however, steadily spreading; and with the clearance of the jungle, the climate will approximate to that of the neighbouring Dehra Dún.

END OF VOLUME XII.

2. There was some difference of opinion regarding the necessity of inspecting small pipes of under 3 inches diameter but it was generally considered that for the sake of conformity it might be advisable to include all main steam pipes, which would be fully defined as meaning only the pipe from the main boiler stop valve to the primer or first user.

3. Mr. Stark thought the interval after the initial inspection should be the same as that laid down by the Board of Trade. This was considered not quite suitable for boilers and after a discussion and a statement by Mr. MacIntosh of the evidence he had hitherto had on the subject it was unanimously agreed that an interval of five years would be satisfactory.

4. All agreed that an external inspection and hydraulic test in place would be sufficient after the first inspection.

5. Opinion differed as to whether it was necessary to have specific tests for the material of main steam pipes, but the others were of opinion that it was necessary to be sound and of good manufacture at the initial inspection.

6. Considerable discussion took place on the use of cast iron for main steam pipes. Mr. Adams was of opinion that cast iron should not be permitted and quoted fatal accidents which had occurred that cast iron main steam pipes were being cut them out. Mr. Stark worked at 80 lbs. in. but the limit of 70 lbs. was being evaded. The question at issue and it was subsequently unanimously agreed that cast iron for main steam pipes should be prohibited altogether for all new installations or renewals of main steam pipe ranges.

7. It was agreed that a certificate was not necessary for steam pipes and that it would be sufficient if the date of test was entered on a foot-note of the Boiler certificate.

taking out of a length of pipe (which was preferable) or efficient blanking of the various pipes, steam or water.

Safety Valves.

(a) Opinion was unanimous that there should be two safety valves on all boilers, of a lock-up valve, but after uselessness in practice, it was agreed that one up valve.

(d) All agreed that two safety valves on one chest should be accepted.

(f) Opinion was unanimous that a safety valve chest to which the main stop valve is bolted is unsatisfactory and should not be allowed.

Manholes.

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Nominal Horse Power.

Every one agreed that this term was obsolete, useless and misleading, that a more appropriate term for calculating the fees for inspection was required. Both evaporative capacity and heating surface were suggested and after some discussion it was agreed that the term "Boiler Rating" based on the approximate heating surface should be used and that a rule should be framed taking in the principal dimensions of the heating surface.

Tube Plates.

(a) Opinion was unanimous that in locomotive type and certain multitubular vertical boilers tube plates under a certain size do not require stays

(b) There was some difference of opinion regarding a suitable maximum diameter of barrel beyond which stay tubes would be required but it was ultimately agreed that the maximum should be 3 feet.

(c) All were of opinion that account should be taken of the holding power of ordinary tubes expanded into parallel or tapered holes, but no rules could be suggested.

Approved

H E SKINNER,—8-2-1921.

Approved.

H R STARK,—9-2-1921

Approved.

R. P. ADAMS,—11-2-1921.

Approved.

C. ADAMS,—11-2-1921.

APPENDIX V.

Summary of Tour.

Dates on which evidence was heard.	Place	NUMBER OF WITNESSES		REMARKS.
		Documentary evidence.	Oral evidence.	
<i>November</i>				
27th to 30th	Lahore	7	9	
<i>December.</i>				
3rd to 5th	Karachi	3	9	
5th to 11th	Bombay	10	12	
13th to 14th	Ahmedabad	9	6	
20th to 22nd	Nagpur	16	14	
<i>January</i>				
3rd to 6th	Calcutta	18	21	Also Conference of Mechanical En- gineers.
10th	Jamshedpur	"	1	
15th	Coimbatore	3	3	
17th to 21st	Madras	11	11	
28th to 2nd Feby.	Rangoon	8	12	
<i>February.</i>				
9th	Shillong	"	8	Conference.
12th	Patna	4	3	
14th to 17th	Cawnpore	23	21	
19th	Agra	1	1	
TOTAL		113	131	

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